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Diversifying Participation: The Rarity of Reporting Racial Demographics in Neuroimaging Research

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Diversifying Participation: The Rarity of Reporting Racial Demographics in Neuroimaging Research

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Abstract

Background: Functional neuroimaging techniques have been instrumental to progress in the cognitive and behavioral sciences; however, their increasing prevalence has evoked conversations concerning limitations associated with reproducibility and bias (Gilmore et al., 2017). While the literature has explored several mechanisms driving issues of replicability, few discussions have considered the effects of confounding social and environmental variables such as age, sex, socioeconomic status, and race (Sauce & Matzel, 2013). The prevailing racial, cultural, and socioeconomic bias in scientific research and the methodological limitations of EEG perpetuate racial and ethnic homogeneity in participation, eliciting qualms regarding the generalizability of findings (Henrich et al., 2010). Thus, across-study differences in participant racial demographics and racial homogeneity may contribute to replicability and generalizability issues, driving inaccurate representations of neurological normalcy.

Methods: A systematic search and subsequent exploratory analysis were used to evaluate the current practices surrounding the transparency and diversity of participation in the field.

Results: The systematic search demonstrated a dearth in the reporting of race and ethnicity demographics of participants in cognitive neuroscience research, as less than five percent of the papers identified documented such information. The exploratory analysis further investigated this trend with respect to EEG research, ultimately supporting the findings of the systematic search and offering future directions for the field of EEG research. Small sample sizes limited analyses with respect to participant diversity and sampling bias.

Conclusions: Moving forward, the field of cognitive neuroscience should aim to increase transparency surrounding research participation and strive for more diverse cohorts. Reporting guidelines and progressive solutions to prejudicial technology will support such directions.

Introduction

Electrophysiological and neuroimaging methods have been used extensively by cognitive neuroscientists seeking to understand the neural substrates and processes that underlie human behavior. Imaging techniques such as functional magnetic resonance imaging (fMRI) and electroencephalogram (EEG) are instrumental tools supporting advancement in cognitive neuroscience as they have allowed scientists to relate behavior to changes in neural activity, permitting more quantitative and in-depth measures of behavioral processes (Morita, Asada, & Naito, 2016). While MRI and EEG are widely regarded as progressive tools for advancement in the study of behavior, issues of reproducibility and bias have attracted much attention (Open Science Collaboration, 2015). In alignment with the recommendations put forth by the 2015 Open Science Collaboration concerning the investigation into reproducibility obstacles in the field, the current paper aims to review the participant demographics of functional neuroimaging studies and explore the related methodological constituents that uphold such biases in the field of cognitive neuroscience.

Idiosyncrasies across a participant cohort emerge through various realms, and such individual variation is often controlled for through statistical analyses that evaluate demographic relationships throughout a study (Gilmore et al., 2017). As contemporary convictions in neuroscience increasingly recognize the social and environmental influences on neural mechanisms and their manifestations, controlling for such variation has become an essential methodological process, especially with regards to age, biological sex, and socioeconomic status (SES) (Farah, 2017; Sauce & Matzel, 2013). Investigations into social and epigenetic influences in neuroscience have largely refuted theories of cognition rooted in biological reductionism, demanding the acknowledgment of relevant psychological, environmental, and social effects on

the brain (Champagne, 2010; Morita et al., 2016). Robust research has revealed epigenetic influences on the central nervous system, facilitating synaptic plasticity, learning, and memory development (Dat & Sweatt, 2011). Moreover, discovery science practices have been used to identify factors of individual variation in functional neuroimaging research, isolating demographics such as sex and age as determinants (Biswal et al., 2010). The failure to acknowledge individual variation can have profound effects on a study, and many have hypothesized that such neglect contributes to the field's contention with reproducibility and generalizability (Isamah et al., 2010; Chatterjee, 2005).

For example, issues of generalization with respect to participant demographics arose for Ihnen and colleagues in investigating the widely disputed prevalence of sexual dimorphisms in fMRI BOLD activity (Ihnen et al., 2009). While prior research had supported the notion of sex differences in BOLD activity, the current study was unable to generalize such sex differences across their task suite. The authors ultimately recommended a more conservative acknowledgment of between-group differences before generalizing trends in neuroimaging studies (Ihnen et al., 2009). Their conclusions provide evidence for the complex nature of participant demographics, which lies at the foundation of the current review.

Beyond exploring the generalizability of findings with respect to cognitive tasks, the emerging application of machine learning models by the field further highlights the importance of obtaining generalizable results (Huf et al., 2014). There are extensive benefits in using machine learning to analyze neuroimaging signals, but successful applications of learning classifiers require clear descriptions of the relevant data. Generalizations made on across-study datasets with varying participant demographics could confound the accuracy of such learning

classifiers (Huf et al., 2014). Indeed, the most progressive analyses available in the field call for the consideration of across-study differences in methods (Huf et al., 2014).

While various idiosyncrasies confound generalizability and require attention, the current review aims to explore the aforementioned demographic influences through specific attributes: race and ethnicity. Categories of race and ethnicity are widely disputed, as both constructs harbor culturally variable definitions and applications. For example, ethnicity reflects one's Hispanic or Latinx origin in the United States, but many European countries understand ethnicity to relate to one's culture, nationality, or religion (Loue, 2006). However, racial categories represent a number of features, including physical attributes, historical affiliation, and shared culture (Schiebinger et al., 2018). It is important to note that race is a socially constructed method of arbitrarily classifying humans, and racial boundaries are heavily influenced by colonialism and imperialism. Moreover, concepts of race are historically prescribed to reflect various economic, political, social, and cultural conditions (Lee, 2019; Manly, 2017).

Regardless of the socio-political motivations driving the race-classification system, race is not an inconsequential identifier, and science has participated in much of the discussion surrounding racial variation. Because of the complex nature of race and ethnicity, the two categories will hereafter be referred to as race and will reflect the demographic categories outlined by the National Institute of Health with adaptations put forth by scholars and activists: white, Black or African American, Asian, Indigenous peoples of the Americas, and Latinx or Hispanic (NIH, 2018; Yellow Bird, 2017).

The effects of race on social interaction and group dynamics have been studied extensively using functional neuroimaging such as EEG and fMRI; however, it is becoming increasingly clear that race effects extend beyond the realm of social psychology, influencing

cognitive processes and mechanisms outside of social scenarios (Brown et al., 2017; Díaz-Venegas et al., 2016; Isamah et al., 2010). Most significantly, findings relating to racial disparities in clinical outcomes have driven much of the recent exploration. For example, in the United States, Alzheimer's Disease (AD) is nearly twice as prevalent amongst the Black community compared to the population of white adults, and such rates cannot be explained by cerebrovascular factors and socioeconomic status alone (Misiura et al., 2020; Manly, 2008). Instead, race effects on cognition likely arise through the intersectional layering of unique stressors and conditions (Manly, 2017; Lee, 2009). To further understand the neurological implications of such effects, cognitive neuroscientists have investigated electrophysiological differences in various clinical settings. The exploration of race differences perpetuated in Alzheimer's disease revealed race-specific functional connectivity patterns and exposed electrophysiological differences between races (Misiura et al., 2020). Similar neural signaling effects by race have also been found with respect to other clinical conditions such as hypertension (Chand, Wu, Qiu, & Hajjar, 2017).

Behavioral studies have also exposed race-related differences in cognition, further driving the need to consider race effects in cognitive neuroscience. An EEG study investigating the influence of race on sleep found that Black participants' sleep was lighter and less rejuvenating than that of white participants, and their EEG revealed decreased power in the delta and beta bands (Hall et al., 2009). Moreover, this effect was independent from correlates associated with SES and education. Race has also been identified as a direct correlate of cognitive functioning among older adults, contrary to expectations of an indirect influence through other social correlates such as SES and education (Zsembik & Peek, 2001). These findings further support the unique intersectional manifestation of race effects on cognition that

cannot be characterized by SES and education demographics alone. Therefore, cognitive scientists must consider racial demographics to harbor similar potentials for confounding effects as other social demographics such as SES and education.

The present paper aims to review current practices of documenting race demographics in cognitive neuroscience research to determine the field's attitudes regarding race as a consequential social demographic influencing the replicability of findings. Moreover, the review aims to address the field's attention to diverse participant recruitment as it relates to the generalizability of research conclusions and the perpetuation of inaccurate descriptions of neurological normalcy.

Methods

A systematic approach was employed to explore the race and ethnicity demographics of participants in EEG and MRI research in cognitive neuroscience. To obtain studies using such methodologies, I narrowed the scope of my search to focus on the top five journals in cognitive neuroscience according to their SCImago Journal Rank (SJR) Score in 2019: Trends in Cognitive Sciences, Neuroscience and Biobehavioral Reviews, Cerebral Cortex, Neuroimage, and Biological Psychiatry, Cognitive Neuroscience and Neuroimaging. Because three of these five journals predominantly publish review articles (i.e., Trends in Cognitive Sciences, Neuroscience and Biobehavioral Reviews, and Biological Psychiatry), the search was further restricted to focus on research published in Cerebral Cortex and Neuroimage. To ensure my analysis reflects modern practices in cognitive neuroscience, the search was limited to research published in 2019. Finally, I identified all articles published in Cerebral Cortex and Neuroimage in 2019 that used MRI or EEG imaging techniques and included at least two human subjects (e.g., in instances of case studies or methodological development). These methods yielded 536 articles,

which can be found in Table S1 in the appendix. Articles that reported the race and ethnicity demographics of their participants were subsequently isolated, resulting in twenty reporting articles, as described in Table 1.

Because the current review aims to evaluate the degree to which participant cohorts in the field represent the greater populations in question, racial demographic information was collected for the institutions and cities through which the research took place for each of the 536 identified articles (Table S1). The institutions and cities of the primary investigators were documented in the absence of a declared recruitment source. The demographics of institutions located in the United States were collected from their diversity reports or official demographic reports. Because race and ethnicity constructs vary by country, demographics for cities or institutions were only included for research conducted in the United States. Moreover, the hypothesized intersectional manifestations of race effects on cognition may not replicate outside of the United States or other Western nations that have historically perpetuated racial categorization. Future directions may aim to develop a more global perspective surrounding racial inclusion in research participation.

Nevertheless, city demographics were collected from the 2019 Census report. Because the U.S. Census considers race and ethnicity as separate categories, the percentage of individuals belonging to each racial category includes those with and without Hispanic or Latinx origin (e.g., Latinx individuals who are racially white are included in the count of white individuals). It is important to note that other sources do not replicate this method of disclosing demographics. For example, institutions typically do not include Latinx individuals in their measure of white students, driving incongruities between the institutional and geographic demographics composed in Table 1 and Table S1 (see Appendix).

Table 1

Overview of articles documenting participant racial demographics in the systematic search.

		Participant Demographics (%)								Institutional Demographics (%)								City Demographics (%)						
Article	Tech	White	Black	Asian	Indig.	Latinx	2+	NR	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City	White	Black	Asian	Indig.	Latinx	2+	NR
Nemrodov et al. (2019)	MRI	100	0	0	0	--	--	--	Carnegie Mellon University	28.1	4.3	30.5	0	8.9	--	9.7	Pittsburgh, PA	66.9	23.2	5.7	0.2	3.1	3.5	--
Engelhardt et al. (2019)	MRI	43.6	5.1	5.1	--	14.5	29.9	1.7	University of Texas Austin	39.9	4.9	19.5	0.1	21.7	2.7	1.2	Austin, TX	48.3	7.8	7.3	0.6	34.3	3.3	--
Spasov et al. (2019)	MRI	99.98	--	--	--	--	--	0.02	ADNI, Harvard University	42.9	6.7	17.4	0.2	11.4	--	9.2	Cambridge, MA	67	11	16	0.2	9.2	4.1	--
Thomason et al. (2019)	MRI	15.4	62.9	7.7	0	--	7.7	--	Michigan State University	65.7	6.8	5.2	0.2	4.3	2.8	--	Detroit, MI	14.6	78.6	1.6	0.3	7.6	1.9	---
Fan et al. (2019)	MRI	69.5	8.3	19.4	0	2.7	--	--	Harvard University	42.9	6.7	17.4	0.2	11.4	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Boots et al. (2019)	MRI	45.7	46.8	--	0	7.4	--	--	University of Illinois at Chicago	33.8	7.9	18.7	0.1	24.5	2.7	--	Chicago, IL	49.4	30.1	6.4	0.3	29	2.7	--
Valenza et al. (2019)	MRI	85.29	5.88	--	0	20.59	--	--	HCP, Harvard University	42.9	6.7	17.4	0.2	11.4	--	9.2	Cambridge, MA	67	11	16	0.2	9.2	4.1	--
Yu et al. (2019)	MRI	0	0	100	0	0	--	--	Tangdu Hospital								Shaanxi, China							
Harnett et al. (2019)	MRI	27.78	72.22	0	0	--	--	--	Birmingham, AL area	59.9	21.2	5.7	0.04	3.2	3.6	--	Birmingham, AL	25.3	70.5	0.9	0.2	3.7	1.6	--
Richmond et al. (2019)	MRI	71.03	--	--	--	--	--	20.7	University of Melbourne								Melbourne, Australia							
Jha et al. (2019)	MRI	76	21.4	2.1	0.4	--	--	--	University of North Carolina at Chapel Hill	62	8	10.7	0.1	7.8	--	--	Chapel Hill, NC	72.9	9.9	12.5	0.2	6.6	3	--
Selvaggi et al. (2019)	MRI	100	0	0	0	--	--	--	Apulia, Italy								Apulia, Italy							
Herzmann et al. (2019)	MRI	--	57.5	--	--	--	--	42.5	Washington University in St. Louis	52.2	8.1	16.6	0.1	8.5	--	6.6	St. Louis, MO	46.2	46.9	3.2	0.2	4	2.3	--
Ferradal et al. (2019)	MRI	45	--	--	--	--	--	55	Harvard University	42.9	6.7	17.4	0.2	11.4	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Marecková et al. (2019)	MRI	100	0	0	0	--	--	--	Masaryk University								Brno, Czechia							
Morton et al. (2019)	MRI	62	17.4	6.5	--	15.2	--	14.1	Wake Forest University	67.5	8.4	3.8	0.8	6.4	2.3	--	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Reineberg et al. (2019)	MRI	82.7	11.3	4.5	--	--	--	--	University of Colorado Boulder	66.3	1.6	5.3	0.2	11	4.9	--	Boulder, CO	87.2	1.2	5.6	0.3	9.8	3.9	--
Del Maschio et al. (2019)	MRI	48	0	52	0	--	--	--	Vita-Salute San Raffaele University, University of Hong Kong, Beijing Normal University								Hong Kong							
Xin et al. (2019)	MRI	50	33	0	0	17	--	--	Allen Human Brain Atlas	42.9	6.7	17.4	0.2	11.4	--	9.2	Cambridge, MA	67	11	16	0.2	9.2	4.1	--
Xu et al. (2019)	MRI	75	--	--	--	--	--	25	Parkland Hospital in Dallas								Dallas, TX	62.5	24.3	3.4	0.3	41.7	2.5	--

Note. The demographics are as reported by the author of research, institution, or census. (*) Source of participant reflects the sources from which the researchers found participants or the institution of the last author, if no source is documented.

Results

The systematic search approach outlined in the methods produced 536 articles of research using EEG or MRI in the field of cognitive neuroscience (Table S1). Twenty papers were identified to have documented their participants' race and ethnicity demographics, representing less than four percent of the articles produced by the search. Ultimately, these results demonstrate the widespread neglect of participant race and ethnicity demographics by the field.

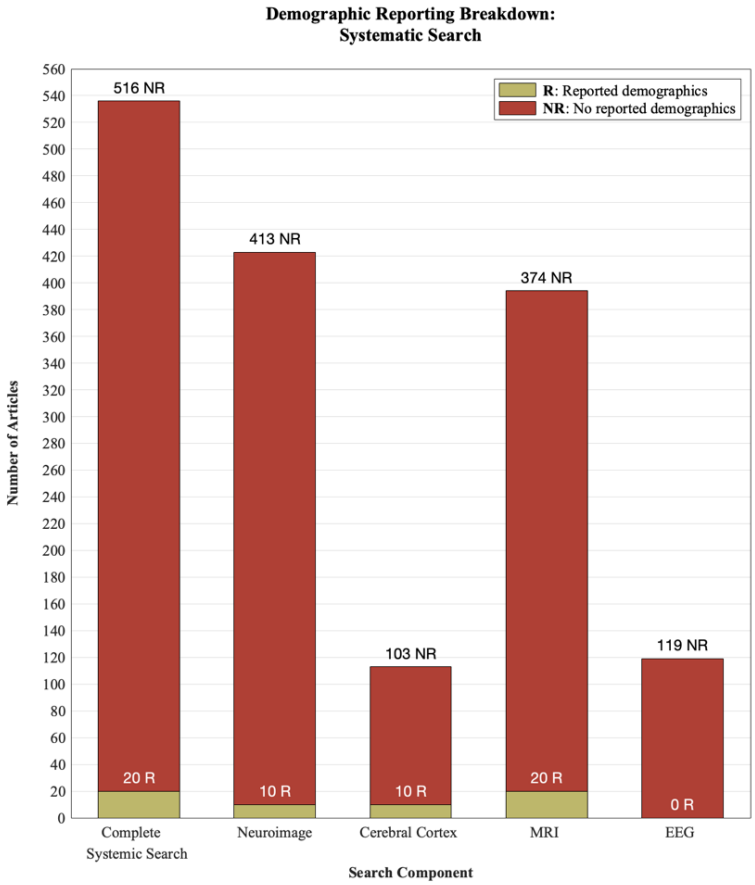

Figure 1. Breakdown in demographic reporting by journal and technology. The complete search produced 20 articles that reported race or ethnicity demographics and 516 papers that did not. 10 of the articles were published in Neuroimage and the other 10 were published in Cerebral Cortex. All 20 articles used MRI.

Various trends in reporting were isolated in an attempt to acquire a more comprehensive understanding of the field's reporting practices. Because demographic requirements and guidelines are often affirmed by the journal of publication, reporting rates by journal were

included in Figure 1. While ten articles from each journal, Neuroimage and Cerebral Cortex, documented their participants' racial demographics, the reporting rate of articles published by Cerebral Cortex was nearly three times that of Neuroimage. However, both of their reporting rates were less than ten percent, suggesting that neither journal is likely to require such demographic inclusion for publication.

Moreover, the demographic breakdowns between research using MRI and EEG techniques are described in Figure 1. While certain methodological practices used in EEG research (see exploratory analysis below) have led to documented difficulties in recruiting participants of color and suggest a degree of homogeneity across EEG research participation, such exploration into diversity was inhibited by the complete lack of reporting by EEG research produced by the present search strategy (Etienne et al., 2020). As depicted in Figure 1, all of the twenty articles reporting racial demographics produced by the search used MRI techniques. However, it is important to note that the majority of the articles collected in general used MRI technology, as depicted in Figure 2, and the lack of EEG reporting could reflect a shortage of EEG research identified by the search strategy.

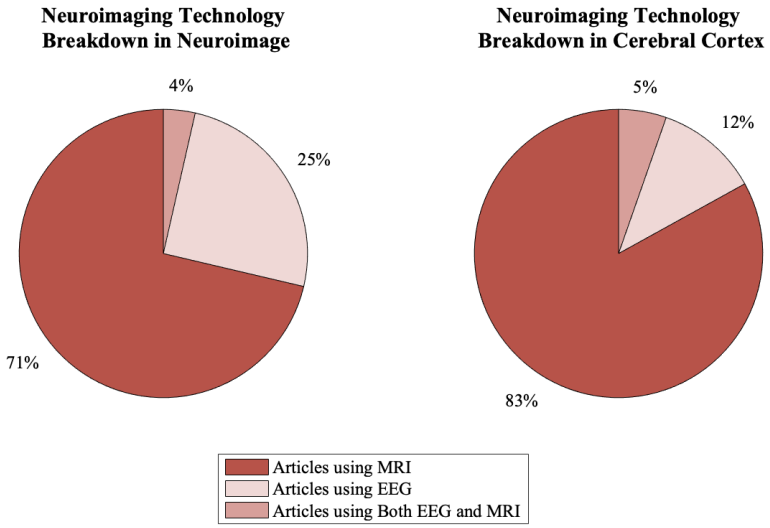

Figure 2. Breakdown of EEG and MRI research identified from the search according to journal of publication. MRI research was published more frequently by both Neuroimage and Cerebral Cortex.

While the current review aimed to explore the standard for diversity in cognitive neuroscience, the overwhelming lack of demographic reporting inhibited such analysis. The relationship between the reported participant demographics and the populational or institutional demographics shown in Table 1 offers a limited representation of participation across the field. Moreover, several trends were identified amongst the twenty reporting articles that suggest that the articles do not reflect a representative sample of cognitive neuroscience research. For example, five of the papers in Table 1 directly study race or a related social variable that may drive researchers to divergently consider diversity during their participant recruitment. Moreover, another five of the articles investigate a topic with a documented race effect, such as facial recognition, which may have driven a select number of intentionally homogenous cohorts (Nemrodov et al., 2019). Lastly, several of the papers acquired data from a public dataset (e.g., ABIDE, Human Connectome Project) that may regulate participant race or ethnicity recruitment.

Overall, thirteen of the twenty articles adhere to one or more of these trends, suggesting that their demographics are not representative of typical participation in cognitive neuroscience research. Additionally, the small sample size of reporting papers drives an even higher likelihood that the articles in Table 1 constitute a non-representative sample. While the current review aimed to expose the patterns in the diversity of participant cohorts in the field, the aforementioned limitations prevent demographic mapping and relevant statistical analyses.

Exploratory Analysis

Due to the lack of EEG representation in the final sample of twenty articles in Table 1, an exploratory search was executed to further divulge the field of EEG research. As previously mentioned, certain facets of EEG technology prevent imaging on individuals with various phenotypical attributes. Due to the existing biases in scientific research participation, EEG caps

are manufactured through two anatomical proportions reflecting the heads of either white or Asian participants and are not resilient to racially constituted attributes such as head size and hair thickness (Shouhayib, 2015). EEG methods also perpetuate cultural exclusion as the hairstyle of a subject can be sufficient to decline their participation in a study as specific hairstyles make the placement of an EEG cap nearly impossible (Etienne et al., 2020). Because an EEG measure requires electrodes to make direct and consistent contact with the scalp according to the cap's suitability, results acquired from Black or Latinx participants are likely to be of a lesser quality than those of white or Asian participants, if they can be attained at all. Therefore, the current review predicts a high degree of participant homogeneity throughout the research domain and introduces a preliminary investigation through an exploratory analysis.

The exploratory search aimed to acquire a general summary of EEG research in the field and offer a preliminary synopsis regarding reporting practices and cohort demographics. The search used several key terms relating to central electrophysiological signals to obtain a broad representation of EEG research. Thus, the key term "EEG" was applied with each of the following terms: "asymmetry", "theta", "ERN", "FRN", "LPP", "N1", "N2", "N4", "P1", "P3", and "Rew-P". This query produced many publications, but articles with large numbers of citations were selected for review, driving a total of 99 high-impact articles published between 1990 and 2020 (Table S2). Once again, articles that reported the race or ethnicity demographics of their participants were isolated and described in Table 2. Ultimately, the exploratory search produced six high-impact papers published in the past thirty years that used EEG and reported their participants' racial demographics. As discussed with respect to the systematic search method, the small sample size of reporting articles limits statistical analysis or demographic

mapping. However, visual inspection of Table 2 suggests a bias towards white participants in EEG research.

Table 2. Overview of articles documenting participant racial demographics in the exploratory analysis.

	Participant Demographics (%)								Institutional Demographics (%)								City Demographics (%)						
Article	White	Black	Asian	Indig.	Latinx	2+	NR	*Source of Recruitment	White	Black	Asian	Indig.	Latinx	2+	NR	City	White	Black	Asian	Indig.	Latinx	2+	NR
Harmon-Jones & Allen (1998)	38.5	22.2	3.85	--	26.9	--	8.55	University of Arizona	51.2	4	5.4	1.6	25.7	--	--	Tucson, AZ	72.4	5.1	3.2	3.5	43.2	5.1	--
Coan et al. (2006)	75.7	2.7	2.7	--	18.9	--	--	George Mason University	41.3	11	20	--	14.2	--	--	Fairfax, VA	69	4.6	17	0.2	16.9	5.2	
Nitschke et al. (1999)	83.5	9	1.5	0	6	--	--	University of Illinois Urbana Champaign	44.7	5.8	18.4	0.1	11.1	--	3.5	Champaign IL	65.1	17.8	13.3	0.1	6.2	2.6	--
Coan et al. (2001)	75.5	2.7	2.7	--	18.9	--	0.2	University of Wisconsin	72	2.2	6.15	--	5.1	--	--	Madison, WI	78.4	6.8	9	0.4	6.9	3.6	--
Chiu & Deldin (2007)	82.9	--	--	--	--	--	17.1	Harvard University	42.9	6.7	17.4	0.2	11.4	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Bress et al. (2013)	92.65	--	--	--	--	--	7.35	Stony Brook University	33.2	6.7	24.1	--	12	--	--	Long Island, NY	85.5	8.2	3.7	0.6	17.3	--	--

Note. The demographics are as reported by the author of research, institution, or census. (*) Source of recruitment reflects the sources from which the researchers found participants or the institution of the last author, if no source is documented.

The reporting rates of participant racial demographics in the exploratory search strategy and the aforementioned systematic search are depicted in Figure 3. The exploratory search aimed to investigate hypotheses surrounding the discriminatory practices of EEG research as well as defend the systematically ascertained results concerning the lack of demographic reporting by the field. While the exploratory search seemingly suggests an increased rate of demographic reporting relative to the systematic search approach, it is critical to note that the exploratory search identified high-impact articles throughout the past thirty years of EEG research while the systematic search looked only at publications in 2019. Moreover, the exploratory search solely aimed to identify preliminary trends in EEG research and did not use systematic methods, suggesting that the search was a non-representative sample of such work in the field of cognitive

neuroscience. Nevertheless, the exploratory analysis supported conclusions surrounding the lack of consideration for participant race and ethnicity, such that the dearth in reporting is not limited to research published in Neuroimage and Cerebral Cortex.

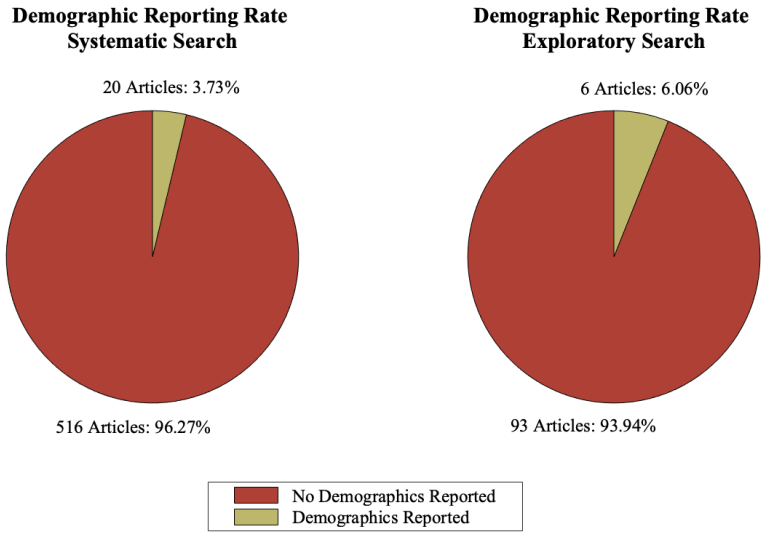

Figure 2. Reporting rates of participant race and ethnicity demographics across the systematic and exploratory search strategies.

Discussion

The methods and techniques used in cognitive neuroscience are advancing at an impressive rate; however, the most efficacious progress is often multifaceted, and the inability to recognize demographic variables such as gender, race, ethnicity, and socioeconomic status in neuroscientific research has vast implications (Gilmore et al., 2017). As discussed in the introduction, environmental and genetic modifications induced by such demographics drive normal variations in brain structure, neural function, and cognition (Barnes, Duarte, Sheridan, & Rajan, 2020). Research has demonstrated the sexual dimorphisms of brain structure and function and the variable allele frequencies of genetic polymorphisms across racial and ethnic backgrounds (Isamah et al., 2010). The lack of consideration of these factors in neuroscientific

and cognitive research is problematic, resulting in inaccurate representations of neurological normalcy. The majority of conclusions surrounding behavioral research are derived from racially, ethnically, and socioeconomically homogenous participant pools; thus, they are likely not generalizable to all populations (Barnes et al., 2020). Moreover, the conclusions of cognitive research are often used to develop policy and inform domains such as education and healthcare. Such applications from the results of under-sampled studies perpetuate systemic oppression across these domains, further demonstrating the need for diverse participant recruitment.

As shown in the systematic search approach results, only twenty out of the 536 articles reviewed documented their participants' race or ethnicity demographics, representing less than five percent of the sample collected. This finding exposes a significant methodological lapse in the field of cognitive neuroscience. Beyond the extensive research supporting the importance of racial and ethnic consideration as a confound in neuroscience research, the lack of transparency perpetuates division in the field, further hindering progress and discovery. The importance of transparency is discussed by Gilmore and colleagues (2017) in their methodological analysis of the field, as they ultimately call for amendments to the infrastructure of cognitive neuroscience to allow for the large-scale application of contemporary findings. The authors approach hurdles of reproducibility and generalizability constituted by complex psychological influences, concluding that the widespread sharing of behavioral tasks, code, and materials steers a promising trajectory for the field (Gilmore, Diaz, Wyble, &, Yarkoni, 2017).

Thus, the first recommendation put forth by the current review calls for increased transparency surrounding participation recruitment and demographic information. Ideally, demographic documentation would supply a cohesive narrative surrounding the source for participation (i.e., the methods, geography, and institutions of recruitment) as well as the racial

and ethnic breakdown of the cohort, and such information would expand upon the demographic information widely collected by the field to date (i.e., sex, age, education, and socioeconomic status). However, it is important to note that complexities surrounding race and ethnicity hinder the idealistic portrayal of a given cohort, likely perpetuating the dearth exposed by the current review (Konkel, 2015).

The descriptive analyses provided by Tables 1 and 2 expose a lack of uniformity in sharing such demographic information. Common practices of reporting demographics in the United States include solely documenting the percentage of white and non-Latinx/Hispanic participants (i.e., those who identify as part of the dominant racial and ethnic group) (Spasov et al., 2019). In contrast, others may report the percentage of two or more racial groups (e.g., white, Black or African American, and Asian), neglecting ethnicity altogether (Del Maschio et al., 2019). Most casually, some simply identify trends, such as all or the majority of the cohort identifies as part of the dominant ethnoracial group (Chiu & Deldin, 2007; Bress et al., 2013). The confusion surrounding reporting methods is unique to race and ethnicity demographics and likely averts scientists in the field from considering such demographics.

To sustain racial and ethnic demographic reporting in cognitive neuroscience, my second recommendation surrounds the development of standard reporting guidelines. Initiatives by the National Institute of Health (NIH) such as the Human Subjects System have required clinical researchers to report their racial and ethnic demographics to promote diversity and inclusion; however, no such programs exist for basic science research (NIH, 2018). Without a standard of inclusion and diversity, researchers will continue to recruit homogenous participant groups on the basis of ignorance. An established standard for reporting demographics would support transparency in the field surrounding participant recruitment, clarifying the landscape of

diversity, and promoting inclusion in neuroscience research. Moreover, guidelines and requirements may be most effective and prevent such additional obstacles from hindering researchers in the field if established by journals of publication. Given the complicated natures and histories of race and ethnicity described in the introduction, demographic reporting standards would be beneficial for research concerning cognition.

While the small sample size of articles with documented demographics offers a limited analysis with respect to participant diversity, a prevailing bias in research participation alludes to predominantly homogenous cohorts, driving the third recommendation of the current review to encourage diverse participant recruitment. Studies have revealed that approximately 80 percent of global research participants in neuroscience and psychology belong to wealthy, Western, and well-educated societies, and subsequent biases towards white research participants have been well documented (Barnes et al., 2020; Konkel, 2015; Henrich, Heidne, & Norenzayan, 2010). Such sampling biases in the field of cognitive neuroscience have perpetuated issues pertaining to construct validity, especially with respect to the study of cognitive decline (Manly 2005; Manly 2008). The work of Dr. Jennifer Manly has largely rejected notions of biological reductionism in the study of cognition, highlighting the importance of diverse participant recruitment and the use of ethnically conscious constructs in the study of behavior (Manly, 2017). The conclusions made by cognitive neuroscientists have vast implications for contemporary interpretations of human behavior, and thus, generalizations about human behavior must be cautiously applied. Without strict disclosure regarding the population to whom the results of a given study apply, it is injurious to assume that findings can generalize beyond the typical white, wealthy, and well-educated participant.

Therefore, the present review calls for progressive solutions to support diverse participant recruitment and address currently prejudicial methodological practices such as those perpetrated by the EEG cap discussed in the exploratory analysis. The cap serves as a widely recognized limitation in EEG research that discriminates against races and ethnicities with textured or non-white hair, perpetuating inherent biases in the field (Etienne, 2020). The initial investigative query produced no EEG research with documented demographics published in Cerebral Cortex or Neuroimage in 2019, and the exploratory search produced only six EEG publications with reported demographics throughout the past thirty years. The lack of reporting may relate to a fundamental homogeneity in EEG research participation that ultimately suppresses replicability concerns; however, diverse participation is critical for evaluating the generalizability of findings. Several mechanisms indeed participate in the manifestation of predominantly white participant cohorts, many of which are reflected in other research domains (Barnes et al., 2020). However, limitations specific to EEG technology may further inhibit diverse participant recruitment, and future directions should aim to eradicate such constraints. Positively, such inequities are rivaled by ongoing work in the field, as evidenced by the various creative solutions surrounding the EEG cap; however, these solutions often place participants of color under additional time constraints (Etienne et al., 2020). Nevertheless, a recent proposal by Matthew Bachman and collaborators out of Duke University suggests that more sizeable work can diminish the inequities associated with the EEG cap, subsequently supporting the current recommendations surrounding diverse participant recruitment.

While functional neuroimaging offers progressive insights surrounding the physiological mechanisms underlying behavior, demographics of race and ethnicity have been largely neglected as important participant attributes by the field of cognitive neuroscience. Race may or

may not have a confounding role and contribute to issues of replicability and generalizability, but such conclusions cannot be substantiated without the corresponding participant data. Without clear participant demographic disclosure, cohorts cannot be determined as representative of the population in question, and perceptions regarding the effects of race on cognition cannot be ascertained.

Conclusions

The current review aims to motivate the field of cognitive neuroscience to reconsider the methods used in describing participant populations in research. Most significantly, the review calls for an increase in participant race demographic reporting in some capacity, though future work may facilitate such transparency by establishing demographic reporting guidelines. Neglecting potentially confounding variables in a study is hazardous for replicability, and a plethora of research has highlighted the effects of race and ethnic origin on cognition (Misiura et al., 2020; Chand et al., 2017; Ito & Bartholow, 2009). Moreover, participant recruitment should strive for the acquisition of diverse participant cohorts. As discussed throughout the current review, several factors influence participant homogeneity, including prejudicial technology and the discriminatory history of scientific research (Shouhayib, 2015; Henrich et al., 2010). Cognitive neuroscience is an innovative and interdisciplinary field capable of achieving substantial discovery with respect to human behavior and cognition; however, progress in the domain is hindered by issues of reproducibility and generalizability (Open Science Collaboration, 2015). Improving transparency and diversity limits these hindrances and supports progressive scientific methods.

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Appendix

Table S1 Demographics of EEG and MRI research in Neuroimage and Cerebral Cortex in 2019

					Institutional Demographics (%)								City Demographics (%)						
First Author	Last Author	Tech	Demo	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City of Research	White	Black	Asian	Indig.	Latinx	2+	NR
David M.A. Mehler	Joseph R. Whittaker	MRI	No	Cardiff University	89	1.4	6.1	--	--	2.7	0.6	Cardiff, Wales							
Frederik S. Kamps	Daniel D. Dilks	MRI	No	Emory University	41	8.2	19	0.1	9.2	--	5.8	Atlanta, GA	40.3	51.8	4.2	0.2	4.3	2.4	--
Lorenzo Vignali	Fabio Richlan	MRI	No	University of Salzburg								Salzburg, Austria							
Mai Nguyen	Uri Hasson	MRI	No	Princeton University	42	7.6	21	0.2	10	--	7.1	Princeton, NJ	73.1	5.8	16.4	0	7.7	3.2	--
M. Germuska	R.G. Wise	MRI	No	University of Oxford	72	--	--	--	--	--	25.2	Oxford, UK	77.5	4.6	12.5	--	--	4	1.4
Camillo Porcaro	Ian H. Robertson	EEG	No	Trinity College Dublin	91	2	5	--	--	--	2	Dublin, Ireland							
Niraj K. Sharma	Louis Lemieux	BOTH	No	University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Roselyne J. Chauvin	Christian F. Beckmann	MRI	No	University of Oxford	72	--	--	--	--	--	25.2	Oxford, UK	77.5	4.6	12.5	--	--	4	1.4
Mark Bydder	Jean-Philippe Ranjeva	MRI	No	Aix-Marseille University								Marseille, France							
Charley Gros	Julien Cohen-Adad	MRI	No	University of Montreal								Montreal, Quebec	87.2	3.2	4	1.4	1.5	--	--
Xiaoping Wu	Kâmil Uğurbil	MRI	No	University of Minnesota	64	4	8.2	0.3	3.2	3.3	--	Minneapolis, MN	63.8	19.4	6.1	1.4	9.6	4.6	--
Michael-Paul Schallmo	Scott O. Murray	MRI	No	University of Washington	44	2.9	20	0.5	7.4	6.3	--	Seattle, WA	68	7	15.1	0.6	6.6	6.8	--
Dan Nemrodov	Adrian Nestor	MRI	Yes	Carnegie Mellon University	28	4.3	31	0	8.9	--	9.7	Pittsburgh, PA	66.9	23.2	5.7	0.2	3.1	3.5	--
Gi-Yeul Bae	Steven J. Luck	EEG	No	UC Davis	25	2.2	28	--	21	--	--	Davis, CA	64.4	2.3	22.2	0.2	13.9	6.8	--
Marc M. Himmelberg	Alex R. Wade	MRI	No	University of York	58	15	1.2	1.2	18	--	2.3	York, UK							
Ranjan Debnath	Nathan A. Fox	EEG	No	University of Maryland	50	13	17	0.1	9.6	--	5.9	College Park, MD	53.8	19.2	14.8	0	14.3	5.6	--
Pan Liu	Koraly E. Pérez-Edgar	BOTH	No	Pennsylvania State University	66	4.4	6.2	0.1	6.6	--	5.1	State College, PA	81.9	4.5	11.2	0.2	4.3	1.7	--
Carlos R. Hernandez-Castillo	Jorn Diedrichsen	MRI	No	Western University								London, Ontario							
Christopher A. Brown	Anthony K. P. Jone	EEG	No	University of Manchester	74	7.3	1.4	--	6.6	--	6.4	Manchester, UK							
J.M.C. van Leeuwen	C.H. Vinkers	MRI	No	University Medical Center Utrecht								Utrecht, Netherlands							
Yi Huang	Rongjun Yu	EEG	No	South China Normal University								Guangzhou, China							
Raphael Vallat	Perrine Ruby	BOTH	No	Lyon University								Lyon, France							
P. Mengotti	R.I. Rumiati	MRI	No	SISSA, Trieste, Italy								Trieste, Italy							
Zhiying Zhao	Benjamin Becker	MRI	No	University of Electronic Science and Technology of China								Chengdu, China							
Yafei Tan	Andreas von Leupoldt	EEG	No	University of Leuven								Leuven, Belgium							

Table S1 Demographics of EEG and MRI research in Neuroimage and Cerebral Cortex in 2019

					Institutional Demographics (%)								City Demographics (%)						
First Author	Last Author	Tech	Demo	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City of Research	White	Black	Asian	Indig.	Latinx	2+	NR
U. Herwig	A.B. Brühl	MRI	No	University Hospital of Psychiatry, Zürich, Switzerland								Zürich, Switzerland							
Sriniwas Govinda Surampudi	Dipanjan Roy	MRI	No	Charite University, HCP								Berlin, Germany							
Eunji Jun	Heung-Il Suk	MRI	No	ABIDE dataset	28.3 / 63.6	7.1 / 4.04	18.7 / 8.22	0.2 / 0.31	14.9 / 3.22	4.4 / 3.33	5.7 / --	New York / Minneapolis	28.3 / 63.8	7.1 / 19.4	18.7 / 6.1	0.2 / 1.4	14.9 / 9.6	4.4 / 4.6	5.7 / - -
Hyunwoo Lee	Douglas L. Arnold	MRI	No	McGill University	76	2.7	23	0.8	3.7	--	--	Montreal, Quebec	87.2	3.2	4	1.4	1.5	--	--
Abdurahman S. Elkhetali	Kristina M. Visscher	MRI	No	University of Alabama at Birmingham	60	21	5.7	0	3.2	3.6	--	Birmingham, AL	25.3	70.5	0.9	0.2	3.7	1.6	--
Lewis Hou	Neil Roberts	MRI	No	University of Liverpool								Liverpool, UK							
Hong Gu	Yihong Yang	MRI	No	National Institutes of Health	57	21	18	0.5	3.5	--	--	Bethesda, MD	81.5	4	6-Oct	0.1	7.5	3.4	--
Matteo Bastiani	Stamatios N. Sotiropoulos	MRI	No	University of Oxford	72	--	--	--	--	--	25.2	Oxford, UK	77.5	4.6	12.5	--	--	4	1.4
Emma Sprooten	Sophia Frangou	MRI	No	Icahn School of Medicine at Mount Sinai								New York, NY	42.7	24.3	13.9	0.4	29.1	3.5	--
Dafnis Batalle	Serena J. Counsell	MRI	No	King's College London	60	4.4	24	--	--	5.3	3.9	London, UK	58.8	13.3	18.4	--	--	5	3.4
Nole M. Hiebert	Penny A. MacDonald	MRI	No	University of Western Ontario								London, Ontario							
Florian Dubost	Marleen de Bruijne	MRI	No	University Medical Center Rotterdam								Copenhagen, Denmark							
Shadab Khan	Ali Gholipour	MRI	No	Boston Children's Hospital	43	6.7	17	0.2	11	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Vaanathi Sundaresan	Mark Jenkinson	MRI	No	UK Biobank data	72	--	--	--	--	--	25.2	Oxford, UK	77.5	4.6	12.5	--	--	4	1.4
Lara Lordier	Petra S. Hüppi	MRI	No	University of Geneva								Geneva, Switzerland							
Virginia Conde	Hartwig Roman Siebner	EEG	No	Copenhagen University								Copenhagen, Denmark							
Iris Ikink	Bernd Figner	MRI	No	Radboud University Nijmegen								Nijmegen, Netherlands							
Ching-fu Chen	Ruey-Song Huang	MRI	No	UC San Diego	19	1.5	35	--	18	--	--	San Diego, California	64.8	6.5	16.7	0.4	30.1	5.2	--
Dafnis Batalle	Serena J. Counsell	MRI	No	King's College London	60	4.4	24	--	--	5.3	3.9	London, UK	58.8	13.3	18.4	--	--	5	3.4
Tanguy Duval	Julien Cohen-Adad	MRI	No	Polytechnique Montreal								Montreal, Quebec	87.2	3.2	4	1.4	1.5	--	--
Jonathan F. O'Rawe	Hoi-Chung Leung	MRI	No	HCP	33	6.7	24	--	12	--	--	New York, NY	85.5	8.2	3.7	0.6	17.3	--	--
Claire D. Monroy	Sabine Hunnius	EEG	No	Radboud University Nijmegen								Nijmegen, Netherlands							
B. Hunyadi	M. De Vos	BOTH	No	University of Oldenburg								Oldenburg, Germany							
Jessica Lebenberg	Jessica Dubois	MRI	No	Université Paris-Saclay								Paris, France							
Yuyao Zhang	Chunlei Liu	MRI	No	Duke University	69	16	9.6	0.3	3.8	--	1.2	Durham, North Carolina	48.4	39.3	5.3	0.3	14.1	2.9	--
Laura E. Engelhardt	Jessica A. Church	MRI	Yes	University of Texas Austin	40	4.9	20	0.1	22	2.7	1.2	Austin, TX	48.3	7.8	7.3	0.6	34.3	3.3	--
Jerod M. Rasmussen	Claudia Buss	MRI	No	UC Irvine	14	1.9	36	0	26	--	4.9	Irvine, CA	47.6	1.9	42.3	0.2	10.3	5.2	--

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First Author	Last Author	Tech	Demo	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City of Research	White	Black	Asian	Indig.	Latinx	2+	NR
Ting Guo	Steven P. Miller	MRI	No	University of Toronto								Toronto, Canada							
Brittany R. Howell	Jed T. Elison	MRI	No	UNC Chapel Hill + UMN	62 / 63.6	8 / 4.04	10.7 / 8.22	0.1 / 0.31	7.8 / 3.22	-- / 3.33	--	Chapel Hill, NC / Minneapolis, MN	72.9 / 63.8	9.9 / 19.4	12.5 / 6.1	0.2 / 1.4	6.6 / 9.6	3/ 4.6	--
Xuyun Wen	Dinggang Shen	MRI	No	University of North Carolina at Chapel Hill	62	8	11	0.1	7.8	--	--	Chapel Hill, NC	72.9	9.9	12.5	0.2	6.6	3	--
Nigel Gebodh	Marom Bikson	EEG	No	City College of NY	14	15	24	0.2	38	--	1.6	New York, NY	42.7	24.3	13.9	0.4	29.1	3.5	--
Nadav Aridan	Tom Schonberg	MRI	No	University of Texas at Austin	40	4.9	20	0.1	22	2.7	1.2	Austin, TX	48.3	7.8	7.3	0.6	34.3	3.3	--
Christian Beste	Tjalf Ziemssen	EEG	No	Technische Universitat Dresden and the Ruhr-Universitat Bochum								Dresden, Germany							
Peiying Liu	Hanzhang Lu	MRI	No	Shengjing Hospital of China Medical University								Shenyang, China							
Eleanor E. Harding	Sonja A. Kotz	EEG	No	University of Leipzig, Germany								Leipzig, Germany							
L. Gui	C. Borradori Tolsa	MRI	No	University Hospitals of Geneva								Geneva, Switzerland							
Jonathan Doucette	Alexander Rauscher	MRI	No	University of British Columbia								Vancouver, BC							
Maximilian Pietsch	J-Donald Tournier	MRI	No	N/A (Dataset of neonatal images)	60	4.4	24	--	--	5.3	3.9	London, UK	58.8	13.3	18.4	--	--	5	3.4
K.M.M. Berghuis	M. Bozzali	MRI	No	IRCCS Santa Lucia Foundation								Sussex, UK							
Misun Kim	Eleanor A. Maguire	MRI	No	University College London	55	5.5	3.1			8.6		London, UK	58.8	13.3	18.4	--	--	5	3.4
Steven W. McNair	Christoph Kayser	EEG	No	Bielefeld University								Bielefeld, Germany							
Frederike H. Petzschner	Klaas E. Stephan	EEG	No	Institute for Biomedical Engineering								Zurich, Switzerland							
Wei Liu	Guillen Fernandez Donders	MRI	No	HCP data								Nijmegen, Netherlands							
Luke Baxter	Rebeccah Slater	MRI	No	University of Oxford	72	--	--	--	--	--	25.2	Oxford, UK	77.5	4.6	12.5	--	--	4	1.4
Giancarlo Valente	Rainer Goebel	MRI	No	Maastricht University								Maastricht, Netherlands							
Marco Steinhauser	Søren K. Andersen	EEG	No	University of Eichstatt-Ingolstadt								Eichstätt, Germany							
Emin Çelik	Tolga Çukur	MRI	No	UC Berkeley	26	1.7	35	--	16	--	--	Berkeley, CA	53.8	8.1	20.2	0.5	11.4	7.5	--
Raphael Vallat	Perrine Ruby	BOTH	No	Lyon University								Lyon, France							
Martin Weygandt	John-Dylan Haynes	MRI	No	Universitätsmedizin, Berlin								Berlin, Germany							
Jonathan H. Venezia	Gregory Hickok	MRI	No	University of California, Irvine	14	1.9	36	0	26	--	4.9	Irvine, CA	47.6	1.9	42.3	0.2	10.3	5.2	--
Yanis Taege	Ferdinand Schweser	MRI	No	State University of New York, Buffalo	48	31	3.2	0.4	12	3.2	--	Buffalo, NY	47.4	36.7	5.6	0.5	11.6	4	--
Kaitlin Cassady	Thad A. Polk	MRI	No	University of Michigan	60	4.2	14	--	5.7	--	--	Ann Arbor, MI	67.4	6.5	17.3	0.3	4.7	4.1	--
Suheyla Cetin Karayumak	Yogesh Rathi	MRI	No	Multiple: Brigham and Women's Hospital, Oxford, PNC data	43	6.7	17	0.2	11	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--

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First Author	Last Author	Tech	Demo	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City of Research	White	Black	Asian	Indig.	Latinx	2+	NR
Marc N. Coutanche	Sharon L. Thompson-Schill	MRI	No	University of Pennsylvania	43	6.2	15	0.1	7.8	3.5	--	Philadelphia, PA	41.2	42.3	7.2	0.4	14.5	3	--
Xirui Hou	Hanzhang Lu	MRI	No	UT Dallas, UTSW	30.2 / 33.5	4.9 / 3.1	23.3 / 18.6	0.2 / 0.04	3.8 / 9.3	3.4 / 2.5	--	Dallas, TX	62.5	24.3	3.4	0.3	41.7	2.5	--
Manasij Venkatesh	Luiz Pessoa	MRI	No	University of Maryland	50	13	17	0.1	9.6	--	5.9	College Park, MD	53.8	19.2	14.8	0	14.3	5.6	--
Mengqi Xing	Olusola Ajilore	EEG	No	University of Illinois at Chicago	34	7.9	19	0.1	25	2.7	--	Chicago, IL	49.4	30.1	6.4	0.3	29	2.7	--
Bertille Somon	Bruno Berberian	EEG	No	The French Aerospace Lab								Grenoble, France							
María Eugenia Lopez	Francisco Barcelo	EEG	No	University of the Balearic Islands								Palma, Spain							
Morgan E. Bartholomew,	Jeffrey M. Spielberg	MRI	No	University of Illinois at Urbana- Champaign.	45	5.8	18	0.1	11	--	3.5	Champaign, IL	65.1	17.8	13.3	0.1	6.2	2.6	--
Raffaele Cacciaglia	Carles Escera	MRI	No	University of Barcelona								Barcelona, Spain							
Spencer A. Arbuckle	Jörn Diedrichsen	MRI	No	University of Western Ontario								London, Ontario							
Ruida Zhu	Chao Liu	MRI	No	Beijing Normal University								Beijing, China							
Hechun Li	Cheng Luo	MRI	No	University of Electronic Science and Technology of China								Chengdu, China							
Andrea Alamia	Gerard Derosiere	EEG	No	Université Catholique de Louvain								Ottignies-Louvain-la-Neuve, Belgium							
Sara Lorio	David W. Carmichael	MRI	No	University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Yordanka Nikolova Yordanova	Guillaume Herbet	MRI	No	Montpellier University								Montpellier, France							
Hyun-Chul Kim	Jong-Hwan Lee	MRI	No	Korea University								Seoul, Korea							
Njoud Aldusary	Marco Piccirelli	MRI	No	University Hospital Zurich								Zurich, Switzerland							
Prokopis C. Prokopiou	Georgios D. Mitsis	MRI	No	University of Oxford	72	--	--	--	--	--	25.2	Oxford, UK	77.5	4.6	12.5	--	--	4	1.4
Kate Ergo	Tom Verguts	EEG	No	Ghent University								Ghent, Belgium							
Noam Goldway	Talma Hendler	EEG	No	Tel Aviv University								Tel Aviv, Israel							
Joseph R. Whittaker	Kevin Murphy	MRI	No	Cardiff University	89	1.4	6.1	--	--	2.7	0.6	Cardiff, Wales							
Olivia Viessmann	Peter Jezzard	MRI	No	University of Oxford	72	--	--	--	--	--	25.2	Oxford, UK	77.5	4.6	12.5	--	--	4	1.4
Allen A. Champagne	Douglas J. Cook	MRI	No	Queen's University								Kingston, ON							
Qiang Li	Shifu Wu	BOTH	No	Southwest University								Chongqing, China							
Sou Nobukawa	Tetsuya Takahashi	EEG	No	Kanazawa University								Kanazawa, Japan							
Teodoro Solis-Escalante	Alfred C. Schouten	EEG	No	Delft University of Technology								Delft, Netherlands							
Angus Ho Ching Fong	Marvin M. Chun	MRI	No	Yale University	45	7	18	0.1	13	--	--	New Haven, CT	44.1	33	4.7	0.4	30.3	4.3	--
K. Rubia	V. Giampietro	MRI	No	South London Clinics	60	4.4	24	--	--	5.3	3.9	London, UK	58.8	13.3	18.4	--	--	5	3.4

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Lars M. Rimol	Jon Skranes	MRI	No	Norwegian University ofScience and Technology								Trondheim, Norway							
Heonsoo Lee	UnCheol Lee	EEG	No	University of Michigan	60	4.2	14	--	5.7	--	--	Ann Arbor, MI	67.4	6.5	17.3	0.3	4.7	4.1	--
Claire Cury	Marc Modat	MRI	No	University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Shivakumar Viswanathan	Gereon R. Fink	EEG	No	University of Cologne								Cologne, Germany							
Tijl Grootswagers	Thomas A. Carlson	EEG	No	University of Sydney								Sydney, Australia							
Kilian Abellaneda-Pérez	David Bartrés- Faz	MRI	No	University of Barcelona								Barcelona, Spain							
Amy M. Belf	G. Gabrielle Starr	MRI	No	New York University	28	7.1	19	0.2	15	4.4	5.7	New York, NY	42.7	24.3	13.9	0.4	29.1	3.5	--
Jinendra Ekanayake	Geraint Rees	MRI	No	University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Michele Guerreri	Silvia Capuani	MRI	No	Institute for Complex Systems, CNR								Rome, Italy							
Kurkela Jari L.O	Astikainen Piia	EEG	No	University of Jyväskylä								Jyväskylä, Finland							
Keyvan Mahjoory	Vadim V. Nikulin	EEG	No	University of Leipzig								Leipzig, Germany							
Kathryn L. West	Bart Rypma	MRI	No	Cambridge Center for Aging and Neuroscience	30	4.9	23	0.2	3.8	3.4	--	Dallas, TX	62.5	24.3	3.4	0.3	41.7	2.5	--
Kristin E. Flegal	Charan Ranganath	MRI	No	University of California at Davis	25	2.2	28	--	21	--	--	Davis, CA	64.4	2.3	22.2	0.2	13.9	6.8	--
M. Catalina Camacho	Susan B. Perlman	MRI	No	University of Pittsburgh	66	4.9	8.7	0.1	3.7	3.4	--	Pittsburgh, PA	66.9	23.2	5.7	0.2	3.1	3.5	--
Narun Pornpattananangkul	Robin Nusslock	EEG	No	Northwestern University	44	5.1	14	0.1	8.5	3.5	--	Evanston, IL	67.2	16.6	9.3	0.1	11.8	3.8	--
Christopher E. Zwillin	Aron K. Barbey	MRI	No	University of Illinois	45	5.8	18	0.1	11	--	3.5	Champaign, IL	65.1	17.8	13.3	0.1	6.2	2.6	--
Alodie Rey-Mermet	Marco Steinhauser	EEG	No	Catholic University of Eichstätt-Ingolstadt								Eichstätt, Germany							
Uijong Ju	Christian Wallraven	MRI	No	Korea University								Seoul, South Korea							
Pengfei Han	Ilona Croy	MRI	No	University of Dresden								Dresden, Germany							
Hualu Han	Xihai Zhao	MRI	No	Beijing Tiantan hospital								Beijing, China							
Elisabetta Patron	Julian F. Thayer	EEG	No	University of Padua								Padua, Italy							
Lauri Tuominen	Daphne Holt	MRI	No	Massachusetts General Hospital	43	6.7	17	0.2	11	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Giulia Liberati	Andre Mouraux	EEG	No	Saint Luc University Hospital								Brussels, Belgium							
Wei Zhang	Karin Roelofs	MRI	No	Donders Institute for Brain, Cognition and Behavior in Nijmegen								Nijmegen, Netherlands							
Frederik Van de Steen	Daniele Marinazzo	EEG	No	Ghent University								Ghent, Belgium							
Corey Horien	R. Todd Constable	MRI	No	University of McGill, University of Pittsburgh, University of Utah	65.5 / 66.5 / 75.6	4.9 / 1.3 / 2.7	8.7 / 5.5 / 23.3	0.07 / 0.4 / 0.8	3.7 / 11.1 / 3.7	3.4 / 4.6 / --	--	Montreal, Quebec / Pittsburgh, PA / Salt Lake City, UT	87.2 / 66.9 / 73.1	3.2 / 23.2 / 2.3	4.0 / 5.7 / 5.4	1.4 / 0.2 / 1.4	1.5 / 3.1 / 21.6	---- / 3.5 / 3.4	--

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Claudia Metzler-Baddeley	Roland J. Baddeley	MRI	No	Cardiff University	89	1.4	6.1	--	--	2.7	0.6	Cardiff, Wales							
Michele Angelo Colombo	Simone Sarasso	EEG	No	University of Liege								Liège, Belgium							
Maxwell L. Elliott	Ahmad R. Hariri	MRI	No	Human Connectome project	69	16	9.6	0.3	3.8	--	1.2	Durham, North Carolina	48.4	39.3	5.3	0.3	14.1	2.9	--
Eva Loos	Annette Milnik	MRI	No	University Hospital of Basel, Switzerland								Basel, Switzerland							
James T. Grist	Ferdia A. Gallagher	MRI	No	University of Cambridge	75	3.1	13	--	--	2.4	--	Cambridge, UK	83.2	1.6	10.7	--	--	--	1.5
Tengda Zhao	Yong He	MRI	No	Peking University								Beijing, China							
Enrico Premi	Barbara Borroni	MRI	No	23 research centers								Brescia, Italy							
Melodie Yen	Stephen M. Wilson	MRI	No	Nashville - Vanderbilt University Medical Center	55	8.7	9.7	0.4	7.7	4.2	--	Nashville, TN	63.2	27.9	3.6	0.2	10.4	2.6	--
Anna I Blazejewska	Jonathan R. Polimeni	MRI	No	Massachusetts General Hospital	43	6.7	17	0.2	11	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Patricia Leon-Cabrera	Joaquín Morís	EEG	No	University of Malaga								Málaga, Spain							
Mark E. Wagshul, PhD	Roee Holtzer, PhD	MRI	No	Albert Einstein College of Medicine	64	2.2	5.2	0.1	3.2	0.6	--	Bronx, NY	44.7	43.6	4.6	2.9	56.4	3.8	--
George Ling	Roscoe Brady Jr	MRI	No	University of Pittsburgh, McLean Hospital, and Beth-Israel Deaconess Medical Center	PIT: 65.5 / H: 42.9	PIT: 4.9 / H: 6.7	PIT: 8.7 / H: 17.4	PIT: 0.07 / H: 0.2	PIT: 3.7 / H: 11.4	PIT 3.4	--	Pittsburgh, PA / Boston, MA	66.9 / 52.6	23.2 / 25.3	5.7 / 9.6	0.2 / 0.3	3.1 / 19.7	3.5 / 5.1	--
Mingrui Xia	Yong He	MRI	No	5 centers in China								Beijing, China							
Bart Aben	Tom Verguts	MRI	No	Ghent University Hospital								Ghent, Belgium							
Rajan Kashyap	Thomas Yeo	MRI	No	HCP								Singapore							
Sharna D Jamadar	Gary F Egan	MRI	No	Monash University								Melbourne, Australia							
Chad C. Williams	Olave E. Krigolson	EEG	No	University of Victoria								Victoria, British Columbia							
Yury Koush	Frank Scharnowski	MRI	No	University of Geneva								Geneva, Switzerland							
Christian Kaiser	Markus Ullsperger	MRI	No	Otto-von-Guericke University								Magdeburg, Germany							
Marie Amalric	Stanislas Dehaene	MRI	No	Université Paris-Sud								Paris, France							
Kendrick Kay	Kamil Ugurbi	MRI	No	University of Minnesota	64	4	8.2	0.3	3.2	3.3	--	Minneapolis, MN	63.8	19.4	6.1	1.4	9.6	4.6	--
Adam Steel	Chris I. Baker	MRI	No	National Institute of Health	57	21	18	0.5	3.5	--	--	Bethesda, MD	81.5	4	6-Oct	0.1	7.5	3.4	--
Michael W. Cole	Carrisa Cocuzza	MRI	No	Washington University-Minnesota Consortium HCP	40	7.8	23	0.1	12	2.8	--	New Brunswick, NJ	64.2	14.6	10	0.1	50.1	2	--
Simeon Spasov	Nicola Toschi	MRI	Yes	Alzheimer's Disease Neuroimaging Initiative (ADNI) database	43	6.7	17	0.2	11	--	9.2	Cambridge, MA	67	11	16	0.2	9.2	4.1	--
Natalia B. Fernandez	Patrik Vuilleumier	MRI	No	University Hospital of Geneva								Geneva, Switzerland							
Weiyan Yin	Tengfei Li	MRI	No	University of North Carolina at Chapel Hill	62	8	11	0.1	7.8	--	--	Chapel Hill, NC	72.9	9.9	12.5	0.2	6.6	3	--

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Roberto Guidotti	Carlo Sestieri	MRI	No	D'Annunzio Chieti University								Chieti, Italy							
Jonathan D. Power	Rebecca M. Jones	MRI	No	Weill Cornell Medicine	37	4.9	22	0.2	8	2.3	--	New York, NY	42.7	24.3	13.9	0.4	29.1	3.5	--
Norberto Eiji Nawa	Hiroshi Ando	MRI	No	Osaka University								Osaka, Japan							
Benjamin T. Carter	Steven G. Luke	MRI	No	Brigham Young University	81	1	3	<1	6	4	4	Provo, UT	88.5	0.5	2.4	0.6	16.6	3.6	--
Jana Zweerings	Klaus Mathiak	MRI	No	Aachen University								Aachen, Germany							
Nasrin Sadat Hashemi	Maryam Ghorbani	EEG	No	Ferdowsi University of Mashhad								Mashhad, Iran							
Syrina Al Aïn	Johannes Frasnelli	MRI	No	University of Quebec								Trois-Rivieres, Quebec	87.2	3.2	4	1.4	1.5	--	--
Matthias Keller	Martin Meyer	MRI	No	University of Zurich								Zurich, Switzerland							
Christopher M. Weise	Dorothee Saur	MRI	No	HCP data								Leipzig, Germany							
Felix Sebastian Nettersheim	Lars Timmermann	MRI	No	University Hospital Cologne								Cologne, Germany							
Khazar Ahmadi	Michael B. Hoffmann	MRI	No	University Medical Center Utrecht								Utrecht, Netherlands							
Yashar Zeighami	Alain Dagher	MRI	No	Parkinson's Progression Markers Initiative (PPMI) database	76	2.7	23	0.8	3.7	--	--	Montreal, Quebec	87.2	3.2	4	1.4	1.5	--	--
Yuchao Jiang	Dezhong Yao	MRI	No	Chengdu Brain Science Institute								Chengdu, China							
Reza Farivar	Robert F. Hess	MRI	No	Wenzhou Medical University, McGill University, Anhui Medical University and University of Sciences and Technology	76	2.7	23	0.8	3.7	--	--	Montreal, Quebec	87.2	3.2	4	1.4	1.5	--	--
Kenneth F. Valyear	Scott H. Frey	MRI	No	University of Missouri	76	6.7	2.4	0.2	3.8	3	--	Columbia, MO	76.9	10.9	6.2	0.3	3.4	4.6	--
Xun Yang	Yong He	MRI	No	West China Mental Health Centre								Beijing, China							
Matthias Walter	Ulrich Mehnert	MRI	No	University of Zürich								Zurich, Switzerland							
Ingmar E.J. de Vries	Christian N.L. Olivers	EEG	No	Vrije Universiteit Amsterdam								Amsterdam, Netherlands							
Micha Pfeuty	Louis Maillard	EEG	No	Université de Lorraine								Grand Est, France							
Chris Racey	Chris M. Bird	MRI	No	Brighton and Sussex Medical School								Sussex, UK							
Moriah E. Thomason	S. Alexandra Burt	MRI	Yes	Hutzel Women's Hospital (Detroit)	66	6.8	5.2	0.2	4.3	2.8	--	Detroit, MI	14.6	78.6	1.6	0.3	7.6	1.9	---
Qiuyun Fan	Susie Y. Huang	MRI	Yes	Massachusetts General Hospital	43	6.7	17	0.2	11	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Heather Shappell	Martin A. Lindquist	MRI	No	HCP Data	43	7.7	14	0.1	8.2	3.5	--	Baltimore, MD	30.4	62.5	2.6	0.3	5.1	2.5	--
Colleen Hughes	Anne C. Krendl	MRI	No	Indiana University	66	4.4	5.3	0.1	5.6	3.5	--	Bloomington, IN	81.4	4.3	9.9	0.4	4.1	3.5	--
Xu Li	Andreia V Faria	MRI	No	Johns Hopkins University	43	7.7	14	0.1	8.2	3.5	--	Baltimore, MD	30.4	62.5	2.6	0.3	5.1	2.5	--
Elena Makovac	Cristina Ottaviani	MRI	No	University of Sussex								Sussex, UK							

Table S1 Demographics of EEG and MRI research in Neuroimage and Cerebral Cortex in 2019

					Institutional Demographics (%)								City Demographics (%)						
First Author	Last Author	Tech	Demo	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City of Research	White	Black	Asian	Indig.	Latinx	2+	NR
Meaghan Elizabeth Spedden	Svend Sparre Geertsen	MRI	No	University of Copenhagen Nørre								Copenhagen, Denmark							
Maria Bianca Amadeo	Monica Gori	MRI	No	Fondazione Istituto Italiano di Tecnologia								Genovese, Italy							
Cinzia Cecchetto	Veronika Schopf	MRI	No	University of Graz								Graz, Austria							
Q. Su	M. Liang	MRI	No	Tianjin Medical University								Tianjin, China							
Marshall A. Dalton,	Eleanor A. Maguire	MRi	No	University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Christopher S.Y. Benwell	`Gregor Thut	EEG	No	University of Glasgow								Glasgow, Scotland							
Adam Hampshire	Ines R. Violante	MRI	No	Imperial College								London, UK	58.8	13.3	18.4	--	--	5	3.4
Jiajie Zou	Nai Ding	EEG	No	Zhejiang University								Hangzhou, China							
S Pandya	A Raj	MRI	No	Parkinson's Progression Markers Initiative (PPMI)	36	5.1	15	0.3	10	3.5	--	Ithaca, NY	68.8	7	17.1	0.2	6.8	4.8	--
Zhenghan Qi	Tyler K. Perrachione	MRI	No	Massachusetts Institute of Technology	32	3.4	17	0.1	8.9	3.4	--	Cambridge, MA	67	11	16	0.2	9.2	4.1	--
Russell Butler	Kevin Whittingstall	BOTH	No	Universitaire de Sherbrooke								Sherbrooke, Quebec	87.2	3.2	4	1.4	1.5	--	--
Timothy Bardouille	CamCAN Group	EEG	No	University of Cambridge	75	3.1	13	--	--	2.4	--	Cambridge, UK	83.2	1.6	10.7	--	--	--	1.5
Giulia Rampone	Marco Bertamini	EEG	No	University of Liverpool								Liverpool, UK							
Ernest Mas-Herrero	Josep Marco-Pallarés	MRI	No	University of Barcelona								Barcelona, Spain							
Joanne L. Park	David I. Donaldson	EEG	No	University of Stirling								Stirling, Scotland							
Isobel W. Green	Poornima Kumar	MRI	No	Harvard University	43	6.7	17	0.2	11	--	9.2	Cambridge, MA	67	11	16	0.2	9.2	4.1	--
Han-Gue Jo	Ute Habe	MRI	No	Aachen University								Aachen, Germany							
Alessandro Tavano	David Poeppel	EEG	No	Max Plank Institute								Frankfurt, Germany							
Alexander von Lautz	Felix Blankenburg	EEG	No	Freie Universitat Berlin								Berlin, Germany							
Fan Nils Yang	Hengyi Rao	MRI	No	University of Pennsylvania	43	6.2	15	0.1	7.8	3.5	--	Philadelphia, PA	41.2	42.3	7.2	0.4	14.5	3	--
Lisa H. Evans	Jane E. Herron	EEG	No	Cardiff University	89	1.4	6.1	--	--	2.7	0.6	Cardiff, Wales							
Radoslaw M. Cichy	Ian Charest	MRI	No	Freie Universitat Berlin								Berlin, Germany							
T. Marins	F. Tovar-Moll	MRI	No	D'Or Institute for Research and Education (IDOR)								Rio de Janeiro, Brazil							
Jeremy Casorso	Rapha¨el Li´egeois	MRI	No	HCP Data								Lausanne, Switzerland							
Lucie Brechet	Joao Jorge	BOTH	No	University Geneva								Geneva, Switzerland							
Qiang Li	Gaoyuan Wang	BOTH	No	Southwest University								Chongqing, China							
Oren Civier	Alan Connelly	MRI	No	HCP Data								Camperdown, Australia							
Xiaowei Zhuang	Dietmar Cordes	MRI	No	University of Colorado, Denver	42	5.3	8.9	0.3	26	--	7	Denver, CO	76.5	9.4	3.8	1	30.3	3.6	--
Ryan V. Raut	Marcus E. Raichle	MRI	No	Midnight Scan Club (MSC) dataset	52	8.1	17	0.1	8.5	--	6.6	St. Louis, MO	46.2	46.9	3.2	0.2	4	2.3	--
Piotr P. Styrkowiec	Gregory Kroliczak	MRI	No	Poznan University								Poznan, Poland							
Michael Lührs	Rainer Goebel	MRI	No	Maastricht University								Maastricht, Netherlands							
Svenja Espenhahn	Nick S. Ward	EEG	No	University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4

Table S1 Demographics of EEG and MRI research in Neuroimage and Cerebral Cortex in 2019

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First Author	Last Author	Tech	Demo	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City of Research	White	Black	Asian	Indig.	Latinx	2+	NR
Chantal MW. Tax	Jelle Veraart	MRI	No	Cardiff University School	89	1.4	6.1	--	--	2.7	0.6	Cardiff, Wales							
Matthew S. Sherwood	Jeremy T. Nelson	MRI	No	Wright State University	72	10	3.1	0.2	3.3	3.8	--	Green County, OH	86.1	7.3	3.1	0.3	3	3.1	--
Vincent Gras	Nicolas Boulant	MRI	No	HCP								Paris, France							
Fraser W. Smith	Marie L Smith	EEG	No	Birkbeck College and University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Ethan Oblak	Jarrod Lewis-Peacock	MRI	No	University of Texas at Austin	40	4.9	20	0.1	22	2.7	1.2	Austin, TX	48.3	7.8	7.3	0.6	34.3	3.3	--
Berman S	Mezer A. A	MRI	No	Hadassah Hospital, Jerusalem								Jerusalem, ISrael							
Aude Jegou	Thien Thanh Dang-Vu	BOTH	No	University of Liège								Liege, Belgium							
Francesco Marini	Jacqueline C. Snow	EEG	No	University of Nevada Reno	58	3.2	8	0.7	19	6.2	--	Reno, Nevada	76.4	2.7	6.5	2.1	24.7	4.8	--
I. Arslanova	B. Forster	EEG	No	University of London								London, UK	58.8	13.3	18.4	--	--	5	3.4
Lena K. L. Oestreich	Marta I. Garrido	EEG	No	University of Queensland								Brisbane, Australia							
Juliane H. Frohner	Nils B. Kroemer	MRI	No	Universitat Dresden								Dresden, Germany							
Hyun-Chul Kim	Jong-Hwan Lee	MRI	No	Korea University / University of Basel								Seoul, South Korea / Basel, Switzerland							
Angela Lombardi	Sabina Tangaro	MRI	No	Istituto Nazionale di Fisica Nucleare								Bari, Italy							
Guido Buonincontri	Joshua D. Kaggie	MRI	No	University of Cambridge	75	3.1	13	--	--	2.4	--	Cambridge, UK	83.2	1.6	10.7	--	--	--	1.5
Xiaopeng Zong	Weili Lin Department	MRI	No	University of North Carolina at Chapel Hill	62	8	11	0.1	7.8	--	--	Chapel Hill, NC	72.9	9.9	12.5	0.2	6.6	3	--
Paulina Cuevas	Benjamin Straube	MRI	No	Philipps University Marburg								Marburg, Germany							
Fengji Geng	Tracy Riggins	MRI	No	University of Maryland	50	13	17	0.1	9.6	--	5.9	College Park, MD	53.8	19.2	14.8	0	14.3	5.6	--
Peng Wang	Andreas K. Engel	EEG	No	Medical Association Hamburg								Hamburg, Germany							
Duan Li	George A. Mashour	EEG	No	University of Michigan	60	4.2	14	--	5.7	--	--	Ann Arbor, MI	67.4	6.5	17.3	0.3	4.7	4.1	--
Giovanni M. Di Liberto	Alain de Cheveigné	EEG	No	Trinity College Dublin	91	2	5	--	--	--	2	Dublin, Ireland							
Gabor Stefanics	Jakob Heinzle	MRI	No	University of Zurich								Zurich, Switzerland							
Jingwei Li	B.T. Thomas Yeo	MRI	No	HCP								Signapore							
Samoni Nag	Julie D. Golomb	MRI	No	Ohio State University	66	5.7	6.5	0.1	4.2	3.2	--	Columbus, OH	59.5	28.5	5.7	0.2	5.9	4.3	--
Elizabeth A. Boots	Melissa Lamar	MRI	Yes	University of Illinois at Chicago	34	7.9	19	0.1	25	2.7	--	Chicago, IL	49.4	30.1	6.4	0.3	29	2.7	--
Olivia Viessmann	Jonathan R. Polimeni	MRI	No	Massachusetts General Hospital	43	6.7	17	0.2	11	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Frithjof Kruggel	Ana Solodkin	MRI	No	HCP Data	14	1.9	36	0	26	--	4.9	Irvine, CA	47.6	1.9	42.3	0.2	10.3	5.2	--
Sebastian Puschmann	Stefan Debener	EEG	No	University of Oldenburg								Oldenburg, Germany							

Table S1 Demographics of EEG and MRI research in Neuroimage and Cerebral Cortex in 2019

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First Author	Last Author	Tech	Demo	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City of Research	White	Black	Asian	Indig.	Latinx	2+	NR
Giovanni M. Di Liberto	Alain de Cheveign	EEG	No	Trinity College Dublin								Dublin, Ireland							
Jessica Weafer	Harriet de Wit	MRI	No	University of Chicago	41	4.4	14	0.1	8,6	3.7	--	Chicago, IL	49.4	30.1	6.4	0.3	29	2.7	--
F. Di Russo	Spinelli D	EEG	No	University of Rome								Rome, Italy							
Marleen Haupt	Kathrin Finke	MRI	No	Ludwig-Maximilians-Universitat München / Technical University Munich								Munich, Germany							
Samuel R. Krimmel	David A. Seminowicz	MRI	No	University of Maryland / University of Leipzig	50	13	17	0.1	9.6	--	5.9	College Park, MD / Leipzig, Germany	53.8	19.2	14.8	0	14.3	5.6	--
Witold X. Chmielewski	Christian Beste	EEG	No	TU Dresden								Dresden, Germany							
Hannah L. Filmer	Paul E. Dux	MRI	No	University of Queensland								St. Lucia, Australia							
Philippe Pinel	Cyril Poupon	MRI	No	ARCHI database project								Gif-sur-Yvette, France							
G Valenza	N Toschi	MRI	Yes	HCP	43	6.7	17	0.2	11	--	9.2	Cambridge, MA	67	11	16	0.2	9.2	4.1	--
Marcie L. King	Chris I. Baker	MRI	No	National Institute of Mental Health	57	21	18	0.5	3.5	--	--	Bethesda, MD	81.5	4	6-Oct	0.1	7.5	3.4	--
Farshid Sepehrband	Arthur W Toga	MRI	No	University of Southern California	32	5.7	17	0.2	14	3.9	--	Los Angeles, CA	52.4	8.9	11.6	0.7	48.6	3.6	--
Amanda K. Robinson	Thomas A. Carlson	EEG	No	University of Sydney								Sydney, Australia							
Ryo Kitada	Norihiro Sadato	MRI	No	National Institute for Physiological Sciences, Nishigonaka								Okazaki, Japan							
Lisa C. Dandolo	Lars Schwabe	MRI	No	University of Hamburg								Hamburg, Germany							
Hang-Yee Chan	Maarten A.S. Boksem	MRI	No	Erasmus University Rotterdam								Rotterdam, Netherlands							
Benjamin Kreifelts	Dirk Wildgruber	MRI	No	Universities of Tübingen and Greifswald								Tübingen, Germany							
Seyed Abolfazl Valizadeh	Lutz Jancke	EEG	No	University of Zurich								Zurich, Switzerland							
Marta Lancione	Mauro Costagli	MRI	No	IRCCS Stella Maris								Pisa, Italy							
Liwei Zhang	Yebing Yang	MRI	No	Beihang University								Beijing, China							
Robert Steinhauser	Marco Steinhauser	MRI	No	Catholic University of Eichstatt-Ingolstadt								Eichstatt-Ingolstadt, Germany							
Laura Bechtold	Christian Bellebaum	MRI	No	University Düsseldorf								Düsseldorf, Germany							
Hamed Honari	Martin A. Lindquist	MRI	No	Johns Hopkins University	43	7.7	14	0.1	8.2	3.5	--	Baltimore, MD	30.4	62.5	2.6	0.3	5.1	2.5	--
Kwangsun Yoo	Marvin M. Chun	MRI	No	Yale University	45	7	18	0.1	13	--	--	New Haven, CT	44.1	33	4.7	0.4	30.3	4.3	--
Yohana Siswandari	Jutta Stahl	EEG	No	University of Cologne								Cologne, Germany							
Adam Zabicki	Britta Krüger	MRI	No	Justus Liebig University								Giessan, Germany							
Isabella C. Wagner	Guillen Fernandez	MRI	No	Radboud University								Nijmegen, Netherlands							
Lauren E. Sherman	Jason M. Chein	MRI	No	Temple University	54	12	11	0.1	6.3	3.2	--	Philadelphia, PA	41.2	42.3	7.2	0.4	14.5	3	--
Yuhui Chai	Peter A. Bandettini	MRI	No	National Institute of Health	57	21	18	0.5	3.5	--	--	Bethesda, MD	81.5	4	6-Oct	0.1	7.5	3.4	--

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					Institutional Demographics (%)								City Demographics (%)						
First Author	Last Author	Tech	Demo	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City of Research	White	Black	Asian	Indig.	Latinx	2+	NR
Stavros Skouras	Frank Scharnowski	MRI	No	Residents of Rockland County, NY								Rockland County, NY	77.9	13.1	6.2	0.2	18.4	2.1	--
Giacomo Novembre	Gian Domenico Iannetti	EEG	No	University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Luca Pion-Tonachini	Scott Makeig	EEG	No	UC San Diego	19	1.5	35	--	18	--	--	San Diego, California	64.8	6.5	16.7	0.4	30.1	5.2	--
Steven H. Baete	Fernando E. Boada	MRI	No	HCP data	28	7.1	19	0.2	15	4.4	5.7	New York, NY	42.7	24.3	13.9	0.4	29.1	3.5	--
Raphaël Sivera	Nicholas Ayache	MRI	No	Alzheimer's Disease National Initiative (ADNI) database								Nice, France							
John G. Grundy	Judith M. Shedden	EEG	No	McMaster University								Hamilton, Ontario							
Dandan Zhang	Ruolei Gu	EEG	No	Shenzhen University								Shenzen, China							
Gadi Goelman	Edda Bilek	MRI	No	Heidelberg University								Mannheim, Germany							
Jarmo A. Hamalainen	April Benasich	EEG	No	Rutgers University	40	7.8	23	0.1	12	2.8	--	New Brunswick, NJ	64.2	14.6	10	0.1	50.1	2	--
Dana Kanel	Frank E. Pollick	MRI	No	University of Glasgow								Glasgow, UK							
Serdar Aslan	Blaise Frederick	MRI	No	HCP data	43	6.7	17	0.2	11	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Bradley N. Jack	Thomas J. Whitford	EEG	No	UNSW Sydney								Sydney, Australia							
Samuel CD. Cartmell	Casey H. Halpern	MRI	No	HCP data	34	4.1	17	0.4	10	6.2	--	Stanford, CA	59.7	1.6	32.6	0.3	5.7	4.6	--
Liang Sun	Gang Li	MRI	No	Baby Connectome Project dataset	62 / 63.6	8 / 4.04	10.7 / 8.22	0.1 / 0.31	7.8 / 3.22	-- / 3.33	--	Chapel Hill, NC / Minneapolis, MN	72.9 / 63.8	9.9 / 19.4	12.5 / 6.1	0.2 / 1.4	6.6 / 9.6	3/ 4.6	--
Kuan Han	Zhongming Liu	MRI	No	Purdue University	64	3	7.3	--	5	--	--	West Lafayette, IN	68.4	3.5	23.6	0.5	4.3	3.2 / 4.3	--
Nico Adelh€ofer	Shu-Chen Li	EEG	No	TU Dresden								Dresden, Germany							
Bernadet L. Klaassens	Serge A.R.B. Rombouts	MRI	No	Leiden University Medical Centre								Leiden, Belgium							
Tanya Wen	Daniel J. Mitchell	EEG	No	University of Cambridge	75	3.1	13	--	--	2.4	--	Cambridge, UK	83.2	1.6	10.7	--	--	--	1.5
Anna E. Hughes	Samuel Schwarzkopf	MRI	No	University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Monique K. LeBourgeois	Salome Kurth	EEG	No	Brown University	42	6.2	14	0.6	11	--	--	Providence RI	33.5	16	6.1	0.2	43		
Maria J. Ribeiro	Miguel Castelo-Branco	EEG	No	University of Coimbra								Coimbra, Portugal							
Samuel St-Jean	Alexander Leemans	MRI	No	HCP								Utrecht, Netherlands							
Utku Kaya	Hulusi Kafaligonul	EEG	No	Ankara University								Anakara, Turkey							
Yusuf Osmanlıoğlu	Ragini Verma	MRI	No	Children's Hospital of Pennsylvania	43	6.2	15	0.1	7.8	3.5	--	Philadelphia, PA	41.2	42.3	7.2	0.4	14.5	3	--
Janis Reinelt	Michael Gaebler	MRI	No	Max Planck Institute, University of Leipzig								Leipzig, Germany							
Meenakshi Khosla	Mert R. Sabuncu	MRI	No	Autism Brain Imaging Data Exchange (ABIDE)	36	5.1	15	0.3	10	3.5	--	Ithaca, NY	68.8	7	17.1	0.2	6.8	4.8	--
Gabriela Bury	María Herrojo Ruiz	EEG	No	University of London								London, UK	58.8	13.3	18.4	--	--	5	3.4
Emma Biondettia	Karin Shmuelia	MRI	No	University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4

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Junjie Wu	Taomei Guo	MRI	No	Beijing Normal University								Beijing, China							
Samantha J. Ma	Danny J.J. Wang	MRI	No	University of Southern California	32	5.7	17	0.2	14	3.9	--	Los Angeles, CA	52.4	8.9	11.6	0.7	48.6	3.6	--
Christoph Birkl	Alexander Rauscher	MRI	No	University of British Columbia								Vancouver, BC							
Francisco J. Rom?an	Aron K. Barbey	MRI	No	University of Illinois, Urbana-Champaign	45	5.8	18	0.1	11	--	3.5	Champaign, IL	66.8	13.6	11.1	--	6.1	--	--
Johanna Wagner	Scott Makeig	EEG	No	Graz University of Technology								Graz, Austria							
Ross Wilson	Stephen D. Mayhew	BOTH	No	University of Birmingham	78	4.5	13	--	--	2	3	Birmingham, UK							
Hongxi Zhang	Dan Wu	MRI	No	Zhejiang University								Zhejiang, China							
Chun-Hung Yeh	Alan Connelly	MRI	No	HCP / University of Melbourne								Melbourne, Australia							
Dylan S. Spets	Scott D. Slotnick	MRI	No	Harvard University / Boston College	42.9 / 55.8	6.7 / 3.79	17.4 / 8.22	0.2 / 0.04	11.4 / 9.17	-- / 2.82	9.2 / --	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Lin Shi	Vincent CT. Mok	MRI	No	Chinese University of Hong Kong								Hong Kong							
Lee Jollans	Robert Whelan	MRI	No	IMAGEN, ABIDE, BNU, COBRE, DLBS, WUSL, NKI, IXI, SALD datasets								Dublin, Ireland							
Lauri Gurguryan	Signy Sheldon	MRI	No	McGill University	76	2.7	23	0.8	3.7	--	--	Montreal, Quebec	87.2	3.2	4	1.4	1.5	--	--
James T. Kennedy	Andrey P. Anokhin	MRI	No	Missouri family registry	52	8.1	17	0.1	8.5	--	6.6	St. Louis, MO	46.2	46.9	3.2	0.2	4	2.3	--
Federica Prinelli	Weili Xu	MRI	No	Stockholm University								Stolkhom, Sweden							
Lilla Zollei	Anastasia Yendiki	MRI	No	Boston Children's Hospital / Reims, Marseille Conception	43	6.7	17	0.2	11	--	9.2	Boston, MA / Marseille, France	52.6	25.3	9.6	0.3	19.7	5.1	--
Julian D. Karch	Simone Kühn	MRI	No	Charite University Clinic, Berlin								Hamburg, Germany							
Maxime Chamberland	Derek K. Jones	MRI	No	Cardiff University	89	1.4	6.1	--	--	2.7	0.6	Cardiff, Wales							
Octave Etard	Tobias Reichenbach	EEG	No	Imperial College								London, UK	58.8	13.3	18.4	--	--	5	3.4
Patrik Andersson	Angelika Lingnau	MRI	No	University of Trento								Trento, Italy							
Megan T. deBettencourt	Kenneth A. Norman	MRI	No	Princeton University	42	7.6	21	0.2	10	--	7.1	Princeton, NJ	73.1	5.8	16.4	0	7.7	3.2	--
Ioanna Zioga	Caroline Di Bernardi Luft	EEG	No	University of London								London, UK	58.8	13.3	18.4	--	--	5	3.4
Simon Leipold	Lutz Jäncke	EEG	No	University of Zurich								Zurich, Switzerland							
Clare E Palmer	James M Kilner1	EEG	No	University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Vanessa Teckentrup	Nils B. Kroemer	BOTH	No	University of Tübingen								Tübingen, Germany							
Andreas Pedroni	Nicolas Langer	EEG	No	University of Zurich								Zurich, Switzerland							
Paula Trujillo	Daniel O. Claassen	MRI	No	Vanderbilt University	55	8.7	9.7	0.4	7.7	4.2	--	Nashville, TN	63.2	27.9	3.6	0.2	10.4	2.6	--
Guo-Rong Wu	Daniele Marinazzo	MRI	No	Propofol and UWS datasets								Ghent, Belgium							

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James Teng	Julian Lim	MRI	No	National University of Singapore								Singapore							
Jona Sassenhagen	Christian J. Fiebach	EEG	No	Goethe University Frankfurt								Frankfurt, Germany							
Nawal Kinany	Dimitri Van de Ville	MRI	No	University of Geneva								Geneva, Switzerland							
Tobias Flaisch	Harald T. Schupp	EEG	No	University of Konstanz								Konstanz, Germany							
Benjamin A. Ely	Junqian Xu	MRI	No	WU-Minn HCP Consortium	52.2 / 63.6	8.1 / 4.04	16.6 / 8.22	0.1 / 0.31	8.5 / 3.22	-- / 3.33	6.6 / --	St. Louis / Minneapolis	46.2 / 63.8	46.9 / 19.4	3.2 / 6.1	0.2 / 1.4	4.0 / 9.6	2.3 / 4.6	--
Yang Yang	Jia-Hong Gao	MRI	No	Peking University								Beijing, China							
Lucas S. Baltzell	Virginia Richards	EEG	No	University of California, Irvine	14	1.9	36	0	26	--	4.9	Irvine, CA	47.6	1.9	42.3	0.2	10.3	5.2	--
R. Hindriks	Deco G	MRI	No	HCP data								Barcelona, Spain							
Evan M. Gordon	Steven M. Nelson	MRI	No	Central Texas Veterans Health Care System	30	4.9	23	0.2	3.8	3.4	--	Dallas, TX	62.5	24.3	3.4	0.3	41.7	2.5	--
Ying Yu	Wen Wang	MRI	Yes	Tangdu Hospital from								Shaanxi, China							
Yingying Wang	Chenglin Zhou	MRI	No	Shanghai University								Shanghai, China							
Daniel Christopher Hoinkiss	David Andrew Porter	MRI	No	University of Glasgow								Glasgow, Scotland							
Ying Meng	Nir Lipsman	MRI	No	Sunnybrook Health Sciences Centre								Toronto, Canada							
Christoph Huber-Huber	David Melcher	EEG	No	University of Trento								Rovereto, Italy							
Esther Ibanez-Marcelo	Enrica L. Santarcangelo	EEG	No	University of Pisa								Pisa, Italy							
Takashi Nakao	Georg Northoff	EEG	No	Hiroshima University								Higashihiroshima, Japan							
Matthieu Gilson	Gorka Zamora-L´opez	MRI	No	ARCHI database								Barcelona, Spain							
Samuel Deslauriers-Gauthier	Maxime Descoteaux	BOTH	No	Universit´e de Sherbrooke								Sherbrooke, Quebec	87.2	3.2	4	1.4	1.5	--	--
Gavin M. Bidelman	Breya Walker	EEG	No	University of Memphis	50	33	3.8	0.2	4.8	3.6	--	Memphis, TN	29.1	64.2	1.6	0.2	7.2	1.6	--
Poortata Lalwani	Thad A. Polk	MRI	No	Ann Arbor, MI area	60	4.2	14	--	5.7	--	--	Ann Arbor, MI	67.4	6.5	17.3	0.3	4.7	4.1	--
Jonathan D. Power	Rebecca M. Jones	MRI	No	HCP								New York, NY	42.7	24.3	13.9	0.4	29.1	3.5	--
Ana Isabel Correia	César F. Lima	MRI	No	University of Porto								Porto, Portugal							
Floor van Meer	Paul A.M. Smeets	MRI	No	University of Bremen, University of Gothenburg, University of Pecs								Utrecht, Netherlands							
Maria Tsantani	Lúcia Garrido	MRI	No	Royal Holloway, University of London, Brunel University London								London, UK	58.8	13.3	18.4	--	--	5	3.4
Erin Goddard	Kathy T. Mullen	MRI	No	McGill University	76	2.7	23	0.8	3.7	--	--	Montreal, Quebec	87.2	3.2	4	1.4	1.5	--	--
Kshipra Gurunandan	Pedro M. Paz-Alonso	MRI	No	BCBL Basque Center on Cognition								San Sebastián, Spain							
Amy FD. Howard	Saad Jbabdi	MRI	No	Oxford Brain Bank	72	--	--	--	--	--	25.2	Oxford, UK	77.5	4.6	12.5	--	--	4	1.4

Table S1 Demographics of EEG and MRI research in Neuroimage and Cerebral Cortex in 2019

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First Author	Last Author	Tech	Demo	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City of Research	White	Black	Asian	Indig.	Latinx	2+	NR
Jiajia Li	Hal Blumenfeld	EEG	No	Yale University	45	7	18	0.1	13	--	--	New Haven, CT	44.1	33	4.7	0.4	30.3	4.3	--
Nicole M. Long	Brice A. Kuhl	EEG	No	University of Oregon	59	2.3	5.6	0.6	11	6.8	--	Eugene, OR	83.3	1.6	4.5	1	9.8	6.2	--
Yu Takagi	Saori C. Tanaka	MRI	No	HCP data								Tokyo, Japan							
Bruce C. Hansen	Vladimir Miskovic	MRI	No	State University of New York at Binghamton	56	5	14	0	10	2	2	Binghamton, NY	73.8	13.2	4.4	0.4	7.1	5.7	--
Christopher M. Weise	Burkhard Pleger	MRI	No	HCP data								Leipzig, Germany							
C. Vidaurre	V.V. Nikulin	EEG	No	Vrije Universiteit Amsterdam								Amsterdamn, Netherlands							
Jan Herding	Felix Blankenburg	EEG	No	Freie Universitat Berlin								Berlin, Germany							
Chi-Chuan Chen	Joshua Oon Soo Goh	MRI	No	National Taiwan University								Taipei, Taiwan							
Kurt G. Schilling	Seth A. Smith	MRI	No	Vanderbilt University	55	8.7	9.7	0.4	7.7	4.2	--	Nashville, TN	63.2	27.9	3.6	0.2	10.4	2.6	--
Vahab Youssofzadeh	Abbas Babajani-Feremi	MRI	No	University of Memphis / University of Tennessee	50 / 76.2	33.4 / 6.26	3.8 / 3.27	0.2 / 0.23	4.8 / 3.95	3.6 / 2.92	--	Memphis, TN	29.1	64.2	1.6	0.2	7.2	1.6	--
C.S. Ferreira	M. Wimber School	MRI	No	University of Birmingham								Edgbaston, UK							
Nina Becker	Erika J. Laukka	MRI	No	Stockholm University								Stockholm, Swede							
Xianwei Che	Bernadette M. Fitzgibbon	EEG	No	Monash University								Melbourne, Australia							
Leonie JT. Balter	Ali Mazaheri	EEG	No	University of Birmingham	78	4.5	13	--	--	2	3	Birmingham, England							
Sarah Jessen	Jonas Obleser	EEG	No	Universitätsklinikum Schleswig-Holstein								Kiel, Germany							
Péter Simor	Ilona Kovács	EEG	No	Péter Catholic University in Budapest								Budapest, Hungary							
Nadjalisse C. Reynolds	Kathy R. Magnusson	MRI	No	Georgia Institute of Technology	44	5.5	17	0	5.7	2.9	--	Atlanta, GA	40.3	51.8	4.2	0.2	4.3	2.4	--
Linden Parkes	Murat Yücel	MRI	No	Amazon Mechanical Turk community (online)								Melbourne, Australia							
César Caballero-Gaudes	Javier Gonzalez-Castillo	MRI	No	National Institute of Mental Health	57	21	18	0.5	3.5	--	--	Bethesda, MD	81.5	4	6-Oct	0.1	7.5	3.4	--
Tijl Grootswagers	Thomas A. Carlson	BOTH	No	University of Sydney								Sydney, Australia							
Donald J Hagler Jr.	Anders M Dale	MRI	No	ABCD Study	19	1.5	35	--	18	--	--	San Diego, CA	64.8	6.5	16.7	0.4	30.1	5.2	--
Khazar Ahmadi	Michael B. Hoffmann	MRI	No	University of Magdeburg								Magdeburg, Germany							
Javier Gonzalez-Castillo	Peter A. Bandettini	MRI	No	HCP	57	21	18	0.5	3.5	--	--	Bethesda, MD	81.5	4	6-Oct	0.1	7.5	3.4	--
Fang-Cheng Yeh	Jessica Barrios-Martinez	MRI	No	University of Pittsburgh	66	4.9	8.7	0.1	3.7	3.4	--	Pittsburgh, PA	66.9	23.2	5.7	0.2	3.1	3.5	--
David J. Schaeffer	Stefan Everling	MRI	No	University of Western Ontario								London, Ontario							
Joonyeol Lee	Yee-Joon Kim	EEG	No	Sungkyunkwan University								Soeul, South Korea							
Sumra Bari	Joaquín Goñi	MRI	No	Purdue University, Yale University	63.9 / 44.7	###	7.3 / 17.6	-- / 0.1	5 / 12.6	--	--	West Lafayette, IN / New Haven, CT	68.4 / 44.1	3.5 / 33	23.6 / 4.7	0.5 / 0.4	4.3 / 30.3	3.2 / 4.3	--
Qunlin Chen	Jiang Qiu	MRI	No	Southwest University								Beijing, China							

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Michalis Kassinopoulos	Georgios D. Mitsis	MRI	No	HCP	76	2.7	23	0.8	3.7	--	--	Montreal, Quebec	87.2	3.2	4	1.4	1.5	--	--
Alican Nalci	Thomas T. Liu	MRI	No	Public dataset (not disclosed)	19	1.5	35	--	18	--	--	San Diego, CA	64.8	6.5	16.7	0.4	30.1	5.2	--
Jacqueline N. Zadelaar	Hilde M. Huizenga	MRI	No	University of Amsterdam								Amsterdam, Netherlands							
Lars Riecke	Lars Hausfeld	EEG	No	Maastricht University								Maastricht, Netherlands							
Nathaniel G. Harnett	David C. Knight	MRI	Yes	Birmingham, AL area	60	21	5.7	0	3.2	3.6	--	Birmingham, AL	25.3	70.5	0.9	0.2	3.7	1.6	--
Wanze Xie	Charles A. Nelson	EEG	No	Dhaka, Bangladesh	43	6.7	17	0.2	11	--	9.2	Dhaka, Bangladesh							
Celia Foster	Isabelle Bülthoff	EEG	No	University Clinic Tübingen								Tübingen, Germany							
Susanne Dietrich	Bettina Rolke	MRI	No	University of Tübingen								Tübingen, Germany							
Eduard Ort	Stefan Pollmann	MRI	No	University Magdeburg								Magdeburg, Germany							
Jalmar Teeuw	Hilleke E. Hulshoff Pol	MRI	No	Vrije Universiteit (VU) Amsterdam and University Medical Center Utrecht (UMCU)								Amsterdam, Netherlands and Utrecht, Netherlands							
Ines Machado	Yangming Ou	MRI	No	St. Olavs University Hospital, Montreal Neurological Institute, Brigham and Women's Hospital	43	6.7	17	0.2	11	--	9.2	Trondheim, Norway / Montreal, Quebec / Boston, MA	---- / 87.2 / 52.6	---- / 3.2 / 25.3	---- / 4.0 / 9.6	---- / 1.4 / 0.3	---- / 1.5 / 19.7	---- / ---- / 5.1	--
Valeria Mongelli	Peter Hagoort	EEG	No	Max Planck Institute								Nijmegen, the Netherlands							
Matthew Moore	Anthony Singhal	BOTH	No	University of Alberta								Edmonton, Alberta, Canada							
Yue Wei	Keiichi Kitajo	EEG	No	HKUST-Shenzhen Research Institute								Hong Kong							
Samuel Planton	Chotiga Pattamadilok	MRI	No	Aix-Marseille Université								Marseille, France							
Louis-Solal Giboin	Mircea Ariel Schoenfeld	MRI	No	University Konstanz								Konstanz, Germany							
Fang Wang	Yu Pan	EEG	No	Shanghai International Studies University								Shanghai, China							
Daniel L. Schwartz	Lisa C. Silbert	MRI	No	Oregon Health & Science University	69	1.6	11	0.6	7.8	5.2	--	Portland, OR	77.1	5.8	8.1	0.7	9.7	5.5	--
Xiaoli Chen	Thomas Wolbers	MRI	No	Otto-von-Guericke University								Madgeburg, Germany							
Anastasia Klimovich-Gray	Mirjana Bozic	MRI	No	University of Cambridge	75	3.1	13	--	--	2.4	--	Cambridge, UK	83.2	1.6	10.7	--	--	--	1.5
Anna M. Zamorano	Boris Kleber	MRI	No	University of the Balearic Islands								Palma de Mallorca, Spain							
Yuchuan Qiao	Yonggang Shi	MRI	No	HCP data	32	5.7	17	0.2	14	3.9	--	Los Angeles, CA	52.4	8.9	11.6	0.7	48.6	3.6	--
Fatima A. Nasrallah	Jeong Hoon Lim	MRI	No	National University of Singapore								Singapore							
Yiheng Tu	Jian Kong	MRI	No	Massachusetts General Hospital	43	6.7	17	0.2	11	--	9.2	52.6	25.3	9.6	0.3	19.7	5.1	--	

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Hongming Li	Yong Fan	MRI	No	HCP data	43	6.2	15	0.1	7.8	3.5	--	Philadelphia, PA	41.2	42.3	7.2	0.4	14.5	3	--
Kenji Ogawa	Shuhei Nishida	MRI	No	Hokkaido University								Sapporo, Japan							
Rinaldo Livio Perri	Francesco Di Russo	EEG	No	University of Rome								Rome, Italy							
Elene Iordanishvili	Ana-Maria Oros-Peusquens	MRI	No	Duisburg-Essen University								Jülich, Germany							
Nina de Lacy	Vince D. Calhoun	MRI	No	Brain Genomics Superstruct project	44	2.9	20	0.5	7.4	6.3	--	Seattle, WA	68	7	15.1	0.6	6.6	6.8	--
Sally Richmond	Sarah Whittle	MRI	Yes	University of Melbourne								Melbourne, Australia							
Siyang Luo	Shihui Han	MRI	No	Peking University								Beijing, China							
Rasa Gulbinaite	Rufin VanRullen	EEG	No	Université Claude Bernard Lyon								Villeurbanne, France							
Sophie Herbst	Jonas Obleser	EEG	No	University of Lübeck								Lübeck, Germany							
Adam Kenji Yamamoto	Cathy J. Price	MRI	No	UCL Queen Square Institute	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Mark Drakesmith	Derek K. Jones	MRI	No	Cardiff University	89	1.4	6.1	--	--	2.7	0.6	Cardiff, Wales							
Yusuke Takeda	Okito Yamashita	MRI	No	ABIDE Data								Kyoto, Japan							
Mark Chiew	Karla L. Miller	MRI	No	University of Oxford	72	--	--	--	--	--	25.2	Oxford, UK	77.5	4.6	12.5	--	--	4	1.4
Alexander Bowring	Thomas E. Nichols	MRI	No	HCP	72	--	--	--	--	--	25.2	Oxford, UK	77.5	4.6	12.5	--	--	4	1.4
Ruimin Wang	Teodora Espinoza	EEG	No	Kyushu University								Fukuoka, Japan							
Lydia J. McKeithan	Seth A. Smith	MRI	No	Vanderbilt University	55	8.7	9.7	0.4	7.7	4.2	--	Nashville, TN	63.2	27.9	3.6	0.2	10.4	2.6	--
Yang Li	Guillaume Thierry	EEG	No	Bangor University								Wales, UK							
Sara Boccadoro	Sven C. Mueller	MRI	No	Ghent University								Ghent, Belgium							
Thomas B. Shaw	Markus Barth	MRI	No	University of Queensland								Brisbane, Australia							
Francesca Garbarini	Anna Berti	MRI	No	University of Turin								Turin, Italy							
Golia Shafie	Bratislav Miši ´	MRI	No	McGill University	76	2.7	23	0.8	3.7	--	--	Montreal, Quebec	87.2	3.2	4	1.4	1.5	--	--
Julien Besle	Katrin Krumbholz	MRI	No	University of Nottingham								Nottingham, England							
Ya Li	Sheng Li	MRI	No	Peking University								Beijing, China							
Bahman Nasseroleslami	Orla Hardiman	BOTH	No	Beaumont Hospital, Ireland	91	2	5	--	--	--	2	Dublin, Ireland							
Matthew A. Scult	Ahmad R. Hariri	MRI	No	Duke University	69	16	9.6	0.3	3.8	--	1.2	Durham, North Carolina	48.4	39.3	5.3	0.3	14.1	2.9	--
Aaron F. Alexander-Bloch	David C. Glahn	MRI	No	San Antonio, TX / HCP	45	7	18	0.1	13	--	--	San Antonio, TX	80.5	6.9	2.8	0.8	64.2	2.9	--
Kevin P. Madore	Daniel L. Schacter	MRI	No	Harvard University	43	6.7	17	0.2	11	--	9.2	Cambridge, MA	67	11	16	0.2	9.2	4.1	--
Budhachandra S. Khundrakpam	Alan C. Evans	MRI	No	NIH Study of Normal Brain Development repository	76	2.7	23	0.8	3.7	--	--	Montreal, Quebec	87.2	3.2	4	1.4	1.5	--	--
Xixi Wang	Feng Lin	MRI	No	University of Rochester	44	4.7	8.4	0.1	5.8	2.4	--	Rochester, NY	47.3	40.3	3.3	1.1	18.3	4.6	--
Xue Wen	Lei Mo	MRI	No	South China Normal University								Guangzhou, China							
Michael P. Notter	Eveline Geiser	MRi	No	University of Lausanne								Lausanne, Switzerland							
Yang Zhang	Xiaoqin Wang	BOTH	No	Tsinghua University								Beijing, China							

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Tobias Feldmann-Wüstefeld	Edward K. Vogel	EEG	No	University of Chicago	41	4.4	14	0.1	8,6	3.7	--	Chicago, IL	49.4	30.1	6.4	0.3	29	2.7	--
Matthias F. J. Sperl	Erik M. Mueller	BOTH	No	Justus Liebig University Giessen								Giessen, Germany							
Kai Hwang	Mark D'Esposito	MRI	No	University of California, Berkeley	26	1.7	35	--	16	--	--	Berkeley, CA	53.8	8.1	20.2	0.5	11.4	7.5	--
Anton Tokariev1	Sampsa Vanhatalo	EEG	No	Helsinki University Central Hospital								Helsinki, Finland							
Jalmar Teeuw	Hilleke E. Hulshoff Pol	MRI	No	Vrije Universiteit (VU) Amsterdam and University Medical Center Utrecht (UMCU)								Utrecht, Netherlands							
Jiangzhou Sun	Jiang Qiu	MRI	No	Southwest University								Chongqing, China							
Douglas A. McQuiggan	Bradley R. Buchsbaum	MRI	No	Helsinki, Finland								Toronto, Ontario							
Shaili C. Jha	Rebecca C. Knickmeyer	MRI	Yes	University of North Carolina (UNC) at Chapel Hill	62	8	11	0.1	7.8	--	--	Chapel Hill, NC	72.9	9.9	12.5	0.2	6.6	3	--
Pierluigi Selvaggi	Alessandro Bertolino	MRI	Yes	Apulia, Italy								Apulia, Italy							
Charlotte S. Herzmann	Christopher D. Smyser	MRI	Yes	Barnes-Jewish Hospital	52	8.1	17	0.1	8.5	--	6.6	St. Louis, MO	46.2	46.9	3.2	0.2	4	2.3	--
Silvina L. Ferradal	Lilla Zöllei	MRI	Yes	Brigham and Women's Hospital (BWH) and Beth Israel Deaconess Medical Center	43	6.7	17	0.2	11	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Klára Mareˇcková	Tomáš Paus	MRI	Yes	Masaryk University								Brno, Czechia							
Hengyi Cao	Tyrone D. Cannon	MRI	No	Emory University, Harvard University, University of Calgary, UCLA, UCSD, University of North Carolina Chapel Hill, Yale University, and Zucker Hillside Hospital	45	7	18	0.1	13	--	--	New Haven, CT	44.1	33	4.7	0.4	30.3	4.3	--
Letizia Casiraghi	Egidio D'Angelo	MRI	No	University of Pavia								Pavia, Italy							
Håkon Grydeland	Edward T. Bullmore	MRI	No	University of Cambridge	75	3.1	13	--	--	2.4	--	Cambridge, UK	83.2	1.6	10.7	--	--	--	1.5
Sara Jahfari	Tomas Knapen	MRI	No	University of Amsterdam								Amsterdam, Netherlands							
Manje A. B. Brinkhuis	Jan W. Brascamp	MRI	No	Utrecht University								Utrecht, Netherlands							
Sarah U Morton	Yangming Ou	MRI	Yes	Brigham and Women's Hospital and Beth Israel Deaconess Medical Center	68	8.4	3.8	0.8	6.4	2.3	--	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Nathalie Bodd Halaas	Anders M Fjell	MRI	No	Oslo University Hospital and Diakonhjemmet Hospital								Oslo, Norway							
Francisco Gil	Antonio Donaire	BOTH	No	Hospital Clínic, Barcelona	43	6.7	17	0.2	11	--	9.2	Barcelona, Spain							

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Xavier Guell	Sheeba Arnold Anteraper	MRI	No	Massachusetts Institute of Technology	32	3.4	17	0.1	8.9	3.4	--	Cambridge, MA	67	11	16	0.2	9.2	4.1	--
Andrew R Bender	Simone Kühn	MRI	No	Max Planck Institute								Berlin, Germany							
Patrick Friedrich	Erhan Genç	MRI	No	Ruhr University Bochum								Bochum, Germany							
Jose L Cantero	Juan Fortea	MRI	No	Hospital del Mar and University Hospital Marqués de Valdecilla								Barcelona, Spain and Cantabria, Spain							
Andrew E Reineberg	Naomi P Friedman	MRI	Yes	Colorado LTS and HCP datasets	66	1.6	5.3	0.2	11	4.9	--	Boulder, CO	87.2	1.2	5.6	0.3	9.8	3.9	--
Robert Vargas	Marcel Adam Just	MRI	No	Carnegie Mellon University	28	4.3	31	0	8.9	--	9.7	Pittsburgh, PA	66.9	23.2	5.7	0.2	3.1	3.5	--
Anne Biton	Roberto Toro	MRI	No	UK Biobank, IMAGEN, ADNI, Lothian Birth Cohort 1936, SHIP, and TREND								Paris, France							
Sara Jahfari	Michael J Frank	MRI	No	University of Amsterdam								Amsterdam, Netherlands							
Maryam Vaziri-Pashkam	Yaoda Xu	MRI	No	Harvard University	43	6.7	17	0.2	11	--	9.2	Cambridge, MA	67	11	16	0.2	9.2	4.1	--
N Tzourio-Mazoyer	B Mazoyer	MRI	No	University of Bordeaux								Bordeaux, France							
A Manzouri	I Savic	MRI	No	University Hospital, Stockholm								Stolkhom, Sweden							
Anna Castiglione	Adam R. Aron	EEG	No	University of California, San Diego	19	1.5	35	--	18	--	--	San Diego, California	64.8	6.5	16.7	0.4	30.1	5.2	--
M. Liang	G.D. Iannetti	MRI	No	University of Oxford, Tianjin Medical University	72	--	--	--	--	--	25.2	Oxford, UK	77.5	4.6	12.5	--	--	4	1.4
K. Whitehead	L. Fabrizi	EEG	No	University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Josipa Alilovic	Heleen A. Slagter	MRI	No	University of Amsterdam								Amsterdam, Netherlands							
Sarah Hamburg	André Strydom	EEG	No	London Down Syndrome Consortium (LonDownS)	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Sara Jahfari	Tomas Knapen	MRI	No	University of Amsterdam								Amsterdam, Netherlands							
Manje A. B. Brinkhuis	Jan W. Brascamp	MRI	No	Utrecht University								Utrecht, Netherlands							
Andrew James Anderson	Xixi Wang	MRI	No	University of Rochester	44	4.7	8.4	0.1	5.8	2.4	--	Rochester, NY							
E. Zita Patai	Hugo J. Spiers	MRI	No	University College London	55	5.5	3.1	--	--	8.6	--	London, UK	58.8	13.3	18.4	--	--	5	3.4
Ru Kong	B T Thomas Yeo	MRI	No	Genomic Superstruct Project (GSP), Hangzhou Normal University, and HCP data								Singapore							
Jiwandeep S Kohli	Ralph-Axel Müller	MRI	No	SDSU and ABIDE (NYU)	34 / 28.3	3.8 / 7.1	12.7 / 18.7	0.4 / 0.1	29.9 / 8.5	6.4 / --	-- / 6.6	San Diego, CA and New York, NY	64.8	6.5	16.7	0.4	30.1	5.2	--
Ashley N Nielsen	Bradley L Schlaggar	MRI	No	Washington University in St. Louis	52	8.1	17	0.1	8.5	--	6.6	St. Louis, MO	46.2	46.9	3.2	0.2	4	2.3	--
Gwyneth A. Lewis	Gregory L. Murphy	MRI	No	New York University	28	7.1	19	0.2	15	4.4	5.7	New York, NY	42.7	24.3	13.9	0.4	29.1	3.5	--

Table S1 Demographics of EEG and MRI research in Neuroimage and Cerebral Cortex in 2019

					Institutional Demographics (%)								City Demographics (%)						
First Author	Last Author	Tech	Demo	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City of Research	White	Black	Asian	Indig.	Latinx	2+	NR
A D Iordan	F Dolcos	MRI	No	University of Illinois at Urbana-Champaign	45	5.8	18	0.1	11	--	3.5	Champaign, IL	65.1	17.8	13.3	0.1	6.2	2.6	--
Suk Won Han	René Marois	MRI	No	Vanderbilt University	55	8.7	9.7	0.4	7.7	4.2	--	Nashville, TN	63.2	27.9	3.6	0.2	10.4	2.6	--
Ghootae Kim	Nicholas B Turk-Browne	MRI	No	Princeton University	42	7.6	21	0.2	10	--	7.1	Princeton, NJ	73.1	5.8	16.4	0	7.7	3.2	--
Angela I Renton	Jason B Mattingley	EEG	No	University of Queensland								Brisbane, Australia							
Rui Yuan	Laszlo Zaborszky	MRI	No	Max Planck dataset	40	7.8	23	0.1	12	2.8	--	New Brunswick, NJ	64.2	14.6	10	0.1	50.1	2	--
Stephanie A Gagnon	Anthony D Wagner	MRI	No	Stanford University	34	4.1	17	0.4	10	6.2	--	Palo Alto, CA	59.7	1.6	32.6	0.3	5.7	4.6	--
Mohammad Darainy	David J Ostry	MRI	No	McGill University	76	2.7	23	0.8	3.7	--	--	Montreal, Quebec	87.2	3.2	4	1.4	1.5	--	--
Seda Cavdaroglu	André Knops	MRI	No	Humboldt Universität zu Berlin								Berlin, Germany							
Nicola Del Maschio	Jubin Abutalebi	MRI	Yes	Vita-Salute San Raffaele University, University of Hong Kong, National Brain Research Center (Manesar, India), Beijing Normal University								Hong Kong							
Didac Vidal-Piñeiro	Anders M Fjell	MRI	No	University of Oslo								Oslo, Norway							
Y Jacob	T Hendler	MRI	No	Tel Aviv University								Tel Aviv, Israel							
Qing Yu	Won Mok Shim	MRI	No	Dartmouth College	48	5.6	13	1.4	8.6	4.2	--	Hanover, New Hampshire							
Genevieve Z Steiner	Robert J Barry	EEG	No	University of Wollongong								Wollongong, Australia							
Abhijit Rajan	Mingzhou Ding	BOTH	No	UC Davis, University of Florida	25.1 / 52.6	2.2 / 6	28.4 / 7.4	-- / 0.2	21.4 / 17.9	2.7 / --	--	Davis, CA / Gainesville, FL	64.4 / 65.9	2.3 / 21.4	22.2 / 7.2	22.2 / 0.4	13.9 / 11	6.8 / 4	--
Jin Cao	Jian Kong	MRI	No	Massachusetts General Hospital	43	6.7	17	0.2	11	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Hongmi Lee	Brice A Kuhl	MRI	No	University of Oregon	59	2.3	5.6	0.6	11	6.8	--	Eugene, OR	83.3	1.6	4.5	1	9.8	6.2	--
R Joanne Jao Keehn	Ralph-Axel Müller	MRI	No	San Diego State University and University of California San Diego	34 / 19.4	3.8 / 1.5	12.7 / 34.6	0.4 / --	29.9 / 18.4	6.4 / --	--	San Diego, California	64.8	6.5	16.7	0.4	30.1	5.2	--
Gilles Vannuscorps	Alfonso Caramazza	MRI	No	Harvard University	43	6.7	17	0.2	11	--	9.2	Cambridge, MA	67	11	16	0.2	9.2	4.1	--
Jasmeer P Chhatwal	Reisa A Sperling	MRI	No	Massachusetts General Hospital, Brigham and Women's Hospital	43	6.7	17	0.2	11	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Maarten J Vaessen	Beatrice de Gelder	MRI	No	Maastricht University															
Cynthia M Ortinau	Kiho Im	MRI	No	Boston Children's Hospital and Brigham and Women's Hospital	43	6.7	17	0.2	11	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Emiel Cracco	Marcel Brass	MRI	No	Ghent University Hospital								Ghent, Belgium							
P Ellen Grant	Elizabeth C Engle	MRI	No	Harvard University	43	6.7	17	0.2	11	--	9.2	Cambridge, MA	67	11	16	0.2	9.2	4.1	--

Table S1 Demographics of EEG and MRI research in Neuroimage and Cerebral Cortex in 2019

					Institutional Demographics (%)								City Demographics (%)						
First Author	Last Author	Tech	Demo	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City of Research	White	Black	Asian	Indig.	Latinx	2+	NR
Lihui Wang	Xiaolin Zhou	BOTH	No	Vrije Universiteit Amsterdam, Peking University								Amsterdam, Netherlands and Beijing, China							
Shipra Kanjlia	Marina Bedny	MRI	No	Johns Hopkins University	43	7.7	14	0.1	8.2	3.5	--	Baltimore, MD	30.4	62.5	2.6	0.3	5.1	2.5	--
Lauri Nummenmaa	Tomi Karjalainen	MRI	No	University of Turku								Turku, Finland							
Julia Erb	Elia Formisano	MRI	No	Katholieke Universiteit Leuven								Leuven, Belgium							
Qilong Xin	Jorge Sepulcre	MRI	Yes	Allen Human Brain Atlas	43	6.7	17	0.2	11	--	9.2	Cambridge, MA	67	11	16	0.2	9.2	4.1	--
Sara J. Hussain	Leonardo G. Cohen	EEG	No	National Institute of Health	57	21	18	0.5	3.5	--	--	Bethesda, MD	81.5	4	6-Oct	0.1	7.5	3.4	--
Huan Liu	Tianming Liu	MRI	No	HCP data	67	8.4	9	0.1	5.2	3.6	--	Athens, GA	40.3	51.8	4.2	0.2	4.3	2.4	--
Sue-Hyun Lee	Chris I. Baker	MRI	No	National Institute of Health	57	21	18	0.5	3.5	--	--	Bethesda, MD	81.5	4	6-Oct	0.1	7.5	3.4	--
Yuehua Xu	Yong He	MRI	Yes	Parkland Hospital in Dallas								Dallas, TX	62.5	24.3	3.4	0.3	41.7	2.5	--
Lisa Marieke Kluen	Lars Schwabe	MRI	No	University of Hamburg															
Patrick S Hogan	Vikram S Chib	MRI	No	Johns Hopkins School of Medicine	43	7.7	14	0.1	8.2	3.5	--	Baltimore, MD	30.4	62.5	2.6	0.3	5.1	2.5	--
Hang-Rai Kim	Yong Jeong	MRI	No	Samsung Medical Center and Asan Medical Center								Seoul, South Korea							
Gangyi Feng	Bharath Chandrasekaran	MRI	No	University of Texas at Austin	40	4.9	20	0.1	22	2.7	1.2	Austin, TX	48.3	7.8	7.3	0.6	34.3	3.3	--
Yajing Si	Peng Xu	EEG	No	University of Electronic Science and Technology of China								Chengdu, China							
Sepideh Sadaghiani	Mark D'Esposito	EEG	No	Oslo University								Oslo, Norway							
Michael D. Gregory	Karen F. Berman	MRI	No	National Institute of Health	57	21	18	0.5	3.5	--	--	Bethesda, MD	81.5	4	6-Oct	0.1	7.5	3.4	--
Irina Anurova	Josef P. Rauschecker	MRI	No	Georgetown University	51	7.2	7.8	0.1	7.5	3	--	Washington D.C.	41	46.9	3.9	0.3	10.9	2.9	--
Chenxi Zhao	Gaolang Gong	MRI	No	China–Japan Friendship Hospital and Peking Union Medical College Hospital								Beijing, China							
Jason P Gallivan	Jody C Culham	MRI	No	Queen's University, University of Western Ontario								Ontario, Canada							
Sami Abboud	Laurent Cohen	MRI	No	Sorbonne Université								Paris, France							
J Eric Schmitt	Michael C Neale	MRI	No	National Institute of Mental Health	57	21	18	0.5	3.5	--	--	Bethesda, MD	81.5	4	6-Oct	0.1	7.5	3.4	--
Mihaela Bobić Rasonja	Nataša Jovanov Milošević	MRI	No	University of Zagreb								Zagreb, Croatia							
Géza Gergely Ambrus	Gyula Kovács	EEG	No	University of Jena								Jena, Germany							
Tarek Amer	Cheryl L Grady	MRI	No	Rotman Research Institute								Toronto, Ontario							
Jie Lisa Ji	Alan Anticevic	MRI	No	Yale University	45	7	18	0.1	13	--	--	New Haven, CT	44.1	33	4.7	0.4	30.3	4.3	--
Mar Martín-Signes	Ana B Chica	MRI	No	University of Granada								Granada, Spain							
Katherine S Aboud	Laurie E Cutting	MRI	No	Vanderbilt University	55	8.7	9.7	0.4	7.7	4.2	--	Nashville, TN	63.2	27.9	3.6	0.2	10.4	2.6	--

Table S1 Demographics of EEG and MRI research in Neuroimage and Cerebral Cortex in 2019

					Institutional Demographics (%)								City Demographics (%)						
First Author	Last Author	Tech	Demo	Source of Recruitment*	White	Black	Asian	Indig.	Latinx	2+	NR	City of Research	White	Black	Asian	Indig.	Latinx	2+	NR
Géza Gergely Ambrus	Gyula Kovács	EEG	No	University of Jena								Jena, Germany							
Carolina Makowski	Alan C. Evans	MRI	No	Douglas Institute in Montreal	76	2.7	23	0.8	3.7	--	--	Montreal, Quebec	87.2	3.2	4	1.4	1.5	--	--
Kristina T. R. Ciesielski	Bruce R. Rosen	MRI	No	Massachusetts General Hospital	43	6.7	17	0.2	11	--	9.2	Boston, MA	52.6	25.3	9.6	0.3	19.7	5.1	--
Lauren E Salminen	Neda Jahanshad	MRI	No	UK Biobank	32	5.7	17	0.2	14	3.9	--	Los Angeles, CA	52.4	8.9	11.6	0.7	48.6	3.6	--
L M Sacheli	E Paulesu	MRI	No	University of Milano-Bicocca, IRCCS Galeazzi Orthopaedic Institute								Milan, Italy							
Juliana Corlier	Andrew F. Leuchter	EEG	No	University of California, Los Angeles	29	3.3	25	0.2	19	4.8	--	Los Angeles, CA	52.4	8.9	11.6	0.7	48.6	3.6	--

Note. The demographics are as reported by the author of research, institution, or census. (*) Source of recruitment reflects the sources from which the researchers found participants or the institution of the last author, if no source is documented

Table S2. Exploratory search into EEG research in cognitive neuroscience.

First Author	Last Author	Year	Report Demo.	Signal	Institution	City
Lisa Kentgen	Gerard Bruder	2000	No	Asymmetry	NY State Psych	New York, NY
Richard Davidson	Wallace Freisan	1990	No	Asymmetry	UC San Francisco	San Francisco, CA
Eddie Harmon-Jones	John Allen	1997	No	Asymmetry	University of Arizona	Tucson, AZ
G Blackhart	Thomas Joiner	2002	No	Asymmetry	Florida State	Tallahassee, FL
John Allen	James Coan	2004	No	Asymmetry	University of Arizona	Tucson, AZ
Andrew Tomarken	Jeffery Henriques	1990	No	Asymmetry	UW Madison	Madison, WI
Stefan Debener	Jürgen Kayser	2000	No	Asymmetry	NY State Psych	New York, NY
Richard Davidson	Jeffery Henriques	2000	No	Asymmetry	UW Madison	Madison, WI
Eddie Harmon-Jones	Cindy Harmon-Jones	2003	No	Asymmetry	UW Madison	Madison, WI
James Coan	John Allen	2003	No	Asymmetry	University of Arizona	Tucson, AZ
James Coan	Eddie Harmon-Jones	2005	Yes	Asymmetry	UW Madison	Madison, WI
James Coan	Patrick McKnight	2003	Yes	Asymmetry	George Mason University	Fairfax, VA
Jack Nitschke	Gregory Miller	2004	Yes	Asymmetry	University of Illinois Urbana Champaign	Champaign, IL
Eddie Harmon-Jones	John Allen	2005	Yes	Asymmetry	University of Arizona	Tucson, AZ
Michael Frank	Tim Curran	2008	No	ERN	UC Boulder	Boulder, CO
Greg Hajcak	Robert Simons	2002	No	ERN	University of Delaware	Newark, DE
Greg Hajcak	Robert Simons	2007	No	ERN	University of Delaware	Newark, DE
Greg Hajcak	Robert Simons	2003	No	ERN	University of Delaware	Newark, DE
Greg Hajcak	Dan Foti	2002	No	ERN	Stony Brook University	Stony Brook, NY
Clay Holroyd	Michael Coles	2002	No	ERN	University of Illinois Urbana Champaign	Champaign, IL
Greg Hajcak	Robert Simons	2003	No	ERN	University of Delaware	Newark, DE
Greg Hajcak	Robert Simons	2000	No	ERN	University of Delaware	Newark, DE
Sander Nieuwenhuis	Molen	1993	No	ERN	University of Amsterdam	
William Gehring	Willoughby	2000	No	ERN	University, of Michigan	Ann Arbor, MI
Clay Holroyd	Jonathon Cohen	2000	No	ERN	Princeton University	Princeton, NJ
William Gehring	Laura Nisenson	2007	No	ERN	University of Michigan	Ann Arbor, MI
William Gehring	Emanuel Donchin	2011	No	ERN	University of Illinois Urbana Champaign	Champaign, IL
Marten Scheffers	Michael Coles	2012	No	ERN	University of Illinois Urbana Champaign	Champaign, IL
William Gehring	RT Knight	2011	No	ERN	UC Berkeley	Berkeley, CA
Ingmar Franken	Wetering	2006	No	ERN	Netherlands	
Pearn Chiu	Patricia Deldin	2010	Yes	ERN		
Jennifer Bress	Greg Hajcak	2012	Yes	FRN	Stony Brook University	Stony Brook, NY
Joshua Carlson	Greg Hajcak	2017	No	FRN	Stony Brook University	Stony Brook, NY
Jennifer Bress	Greg Hajcak	2009	No	FRN	Stony Brook University	Stony Brook, NY
Dan Foti	Greg Hajcak	2007	No	FRN	Stony Brook University	Stony Brook, NY
Greg Hajcak	Robert Simons	2008	No	FRN	University of Delaware	Newark, DE
Cavanagh	John Allen	2009	No	FRN	University of Arizona	Tucson, AZ
Cavanagh	Michael Frank	2000	No	FRN	Brown	Providence RI

Table S2. Exploratory search into EEG research in cognitive neuroscience.

First Author	Last Author	Year	Report Demo.	Signal	Institution	City
Darin Brown	Cavanagh	1997	No	LPP	University of New Mexico	Albuquerque, NM
Greg Hajcak	Dan Foti	1994	No	LPP	Stony Brook University	Stony Brook, NY
Greg Hajcak	Dan Foti	1994	No	LPP	Stony Brook University	Stony Brook, NY
Dan Foti	Greg Hajcak	1995	No	LPP	MIT	Cambridge, MA
Dan Foti	Joseph Dein	2001	No	LPP	University of Louisville	Louisville, KY
Edward Vogel	Steven Luck	2014	No	N1	University of Iowa	Iowa City, IA
Wijers	Mulden	2001	No	N1	University of Groningen	
Carlos Gonzales	Steven Hillyard	1994	No	N1	UC San Diego	San Diego, CA
Steven Luck	Harold Hawkins	2006	No	N1	Naval Research	Annapolis, MD
S Johannes	GR Magun	2010	No	N1	UC Davis	Davis, CA
Martin Eimer	John Driver	2013	No	N1	UC London	
Anne Collins	Michael Frank	2020	No	N1	Brown University	Providence RI
Martin Eimer	John Driver	2019	No	N140	University College London	
Steven Luck	Steven Hillyard	1992	No	N2	UC San Diego	San Diego, CA
Qin Zhang	Yang Jiang	1993	No	N2	University of Kentucky	Lexington, KY
Andrew Engell	Greg McCarthy	2008	No	N2	Yale University	New Haven, CT
Tamara Swaab	Cameron Carter	2002	No	N400	UC Davis	Davis, CA
Evie Malaia	Ronnie Wilbur	2002	No	N400	Purdue University	West Lafayette, IN
Roosa E. Kallionpää	Katja Valli	1994	No	N400	University of Skovde	
Arti Nigam	Robert Simons	2004	No	N400	University of Delaware	Newark, NJ
Colin Brown	Peter Hagoort	2006	No	N400	Max Plank Institute for Psycholinguistics	
Steinbeis	Stefan Koelsch	1994	No	N400	University of Sussex	
Eric Halgren	Anders Dale	1997	No	N400	Harvard University	Cambridge, MA
Markus Keifer		1994	No	N400		
Anna Nobre	Gregory McCarther	1995	No	N400	Yale University	New Haven, CT
Tamara Swaab	Peter Gordon	1994	No	N400	UNC Chapel Hill	Chapel Hill, NC
Qin Zhang	Yang Jiang	2004	No	N400	University of Kentucky	Lexington, KY
Heinze	Steven Hillyard	2007	No	P1	UC San Diego	San Diego, CA
Woldorff	P Gerabeck	2007	No	P1	San Antonio	
Carlos Gonzales	Steven Hillyard	1994	No	P1	UC San Diego	San Diego, CA
S Johannes	GR Magun	2005	No	P1	UC Davis	Davis, CA
Steven Luck	Harold Hawkins	1999	No	P1	Naval Research	Annapolis, MD
Yeung	Stanfey	2003	No	P3	Princeton University	Princeton, NJ
Azizian	John Polich	2018	No	P3	The Scripps Research Institute	La Jolla, CA
Mathew Conroy	John Polich	2018	No	P3	The Scripps Research Institute	La Jolla, CA
Steven Luck	Steven Hillyard	2011	No	P3	UC San Diego	
Nick Yeung	Jonathon Cohen	2014	No	P3	Princeton University	Princeton, NJ
Marco Comerchero	John Polich	2016	No	P3	The Scripps Research Institute	La Jolla, CA
John Polich	Marco Comerchero	2020	No	P3a	The Scripps Research Institute	La Jolla, CA
Cavanagh	Mueen	2018	No	P3a	University of New Mexico	Albuquerque, NM
Darin Brown	Cavanagh	2016	No	Rew-P	University of New Mexico	Albuquerque, NM

Table S2. Exploratory search into EEG research in cognitive neuroscience.

First Author	Last Author	Year	Report Demo.	Signal	Institution	City
Travis Baker	Clay Holroyd	2016	No	Rew-P	University of Victoria	
Carmen Lukie	Clay Holroyd	2011	No	Rew-P	University of Victoria	
Caroline Meadows	Matthew Miller	2009	No	Rew-P	University of Alabama	Tuscaloosa, AZ
Darin Brown	Cavanagh	2018	No	Rew-P	University of New Mexico	Albuquerque, NM
Jeffrey Cockburn	Clay Holroyd	2005	No	Rew-P	University of Victoria	
Hunter Threadgill	Philip Gable	2004	No	Rew-P	University of Alabama	Tuscaloosa, AZ
Sepideh Heydari	Clay Holroyd	2013	No	Rew-P	University of Victoria	
Darin Brown	Cavanagh	2017	Yes	Rew-P	University of New Mexico	Albuquerque, NM
Andy Belden	Deanna Barch	2012	Yes	Rew-P	Washington University St. Louis	St. Louis, MO
Gi-Yeul Bae	Steven Luck	2020	No	Topo Traces	UC Davis	Davis, CA
Michael Crowley	Linda Mayes	2001	Yes	mf THETA	Yale University	New Haven, CT
Stefon Noordt	Michael Crowley	2006	Yes	mf THETA	Yale University	New Haven, CT
Cavanagh	Michael Frank	1999	No	mf THETA	Brown University	Providence, RI
Cavanagh	John Allen	1998	No	mf THETA	University of Arizona	Tucson, AZ
Arun Singh	James Cavanagh	2007	No	mf THETA	University of New Mexico	Albuquerque, NM
Julie Onton	Scott Makeig	2013	No	mf THETA	UC San Diego	San Diego, CA
Phan Luu	Scott Makeig	2020	No	mf THETA	UC San Diego	San Diego, CA
Caroline Luft	Joydeep Bhattacharya	2016	No	mf THETA	University of London	
Hause Lin	Michael Inzlicht	2014	No	mf THETA	University of Toronto	
Christa Neuper	Silvia Erika Kober	2015	No	mf THETA	University of Graz	Graz, Austria

Note. The signals documented reflect the signals used as key terms used to identify each study. The signal may reflect the most prominent signal of study in each paper or reflects one of several signals explored by an article.